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Increasing port competitiveness by enhancing logistics performance : a case of Madagascar

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INCREASING PORT COMPETITIVENESS BY ENHANCING LOGISTICS PERFORMANCE

A CASE OF MADAGASCAR

By

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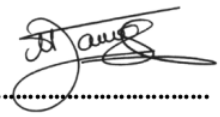
Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 
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Abstract

Title of Dissertation: **Increasing port competitiveness by enhancing logistics performance: a case of Madagascar**

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Ports are of paramount importance in the maritime transport sector and in logistics in general. They are the interfaces between ships and land and fully play their roles as a support for connectivity and mobility. As a gateway for the national and international trade and economic, the growth cannot be sustainable without ports responding to users needs, creators of development economic zones, and competitive without capacities to insure efficiently the flows generated by economic activities. Compared to countries in the region Madagascar 's logistics performance is low. This study using data analysis, PESTL, Porter's Diamond model and SWOT analysis shows the importance of the government, investors, ports operators and port authority in the port industry in Madagascar. From this analysis, the paper provides recommendations strategies to be considered by the actors mentioned above, in order to increase the competitiveness of the port of Toamasina.

KEYWORDS: **Port competitiveness, Logistics performance, Porter Diamond model, Madagascar**

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List of Abbreviations

ACP	Caribbean and Pacific
AFD	Agence francaise de Developpement
AGOA	Africa Growth and Opportunity Act
APMF	Agence Portuaire Maritime et Fluviale
AU	African Union
BAGC	Beira Agricultural Growth Corridor
CdM	Cornelder de Moçambique
CFM	Portos e Caminhos de Ferro de Moçambique
CHCL	Cargo Handling Corporation Limited
CO_2	Carbon dioxide
COMESA	Common Market for Eastern and Southern Africa
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNI	Gross National Income
INSTAT	Institut National de la Statistique de Madagascar
IOC	Indian Ocean Commission
ITF	International Transport Forum
JICA	Japan International Cooperation Agency
LDC	Least Developed Countries
LPI	Logistics Performance Index
LSCI	Liner Shipping Connectivity Index
MICTSL	Madagascar International Container Terminal Services Limited
MPA	Mauritius Port Authority
MTTW	Ministry of Transport, Tourism and Weather
NAFTA	North American Free Trade Agreement
OEC	Observatory of Economic Complexity
OECD	Organisation for Economic Co-operation and Development
PEM	Plan d'emerengence de Madagascar
PGE	Politique Generale de l'Etat
PLSC	Port Liner Shipping Connectivity Index
PPP	Public-Private Partnership
PTP	Plateform Terminal Petrolier
SADC	Southern African Development Community
SAVA	Sambava Antalaha Vohémar Andapa
SGP	Système Généralisé de Préférences
SMMC	Société de Manutention de Marchandises Générales”

TEU	Twenty-foot Equivalent Units
TSA	Tout sauf les armes
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade Development
USD	United States Dollar
WTO	World Trade Organisation

CHAPTER 1 INTRODUCTION

This chapter presents a summary of the maritime transport sector development, the interdependence of trade to logistics and a review of logistics performance in Madagascar. This chapter also explains the reason behind this study, affirming its research questions and intended objectives of the study. And last, the presentation structure of this study

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1.1 Background

The pervasiveness of maritime transport on the global scale is evident. According to the United Nations Conference on Trade Development (UNCTAD, 2019), in 2019, more than 80 per cent of trade was carried out by the sea. In 2018, worldwide container ports throughput reached almost 800 million Twenty-foot Equivalent Units (TEU). Thanks to the shipping industry, countries around the world are connected through international trade, receiving fundamental goods such as food, medicines or manufactured products from other countries. International trade makes countries interdependent, thus making the shipping industry and ports vital links for countries to attain economy benefits (United Nations, 2016). Although maritime transportation covers most cargoes (International Transport Forum, 2019), setting up direct shipping links between each nation is technically and economically challenging. For example, cargo volumes might not be adequate for a voyage or ports may be far from each other.

To evaluate the trade connectivity between countries, UNCTAD developed an indicator termed "Liner Shipping Connectivity Index" (LSCI). This indicator provides quantitative information such as number of vessels serving a port/country, vessels TEU capacities, number of liner shipping providing services to the port/country (UNCTAD, 2006). Hence, the LSCI reflects the liner shipping traffic intensity and strategy to cover the market (Rodrigue, 2010). As argued by Wilmsmeier and Sánchez (2010), a country's level of integration to the liner shipping network is a crucial factor for its trade volume. The level of integration can be used: first, as a reference for a country to know how good the country is connected to the maritime shipping; second, as a reference to understand how well the country trade facilitation is. Furthermore, the level of integration is determined by the country's accessibility in the global trade, the country's ability to provide cargo at a competitive cost as well as the competitiveness of the port in the market. In these terms, the more integrated the country is, the more trading partners want to trade with the country (UNCTAD, 2019)

Following Gani (2017), the willingness of countries to integrate into international trade is intensifying. However, this integration does not rely only on international trade system but also on the quality of the service a country can provide. In order to assess the country's performance in terms of logistics, the Logistics Performance Index (LPI) of the World Bank allows to investigate a country logistics performance, users' satisfaction level regarding the trade facilitation of a country and its evolution performance over the time through different areas (Ojala and Çelebi, 2015).

Furthermore, transportation as derived demand commits shipping lines to innovate their services and build proximity to their customers. If the core business of shipping lines is related to maritime and container logistics (port-to-port services), the shipping industry develops its business on the inland logistics (door-to-door services) by proposing solutions to help customers to focus on their core businesses. In this sense, offering different services - such as inland transportation, brokerage fee, warehousing - available to clients, give opportunities to the shipping companies to increase their revenue, and enhance their vertical integration (AlixPartners, 2019).

This change marks new perspectives for countries. Primarily, this situation implicates responsibility from the host nation to improve infrastructures in a way to smooth the logistics operations, meanwhile creates dynamism between different stakeholders (i.e. policymakers, ports, exporters). Also, by providing infrastructure, the country generates benefits and improve the nation development. For example, facilitating international trade and contributes to the expansion of domestics' industries (Zuraimi et al., 2013).

Madagascar is an island located in the South-Eastern part of Africa. The country is separated by the Mozambican channel located in the Indian Ocean. The total area of the country is 587,041 km^2 with more than 5,000 km of coastline. Madagascar has a geostrategic location on the South-South trade route of maritime trade that links the African, Asian, and American markets. According to "Agence Portuaire Maritime et Fluviale" (APMF) (2020), the agency taking in charge of the maritime regulatory, Madagascar possesses 17 ports which are regional interest and national interest.

The Port of Toamasina accounts for 76 to 80% of the total amount of national traffic, excluding dhow traffic. Between 20% and 24% of the traffic is accumulated by the seven other ports of national interest, Antsiranana (Diego Suarez), Nosy Be (Andoany), Vohemar, Antalaha, Mahajanga, Toliara and Tolagnaro (Ehoala), except dhow traffic. Dhows play an essential role in supplying the economy as well as in distributing local production (APMF, 2020).

Compared to its neighbouring countries, the Logistics Performance Indicator (LPI) scores in Madagascar are low (World Bank, 2020), even when compared to the neighbouring countries (see Table 1). Comparing Madagascar's LPI to other nations, Madagascar's users are not satisfied with the logistics performance of the country, especially about the infrastructure.

Country	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timeliness
South Africa	29	3.51	3.29	3.39	3.53	3.42	3.56	3.85
Kenya	63	2.93	2.66	2.68	2.86	2.88	3.11	3.35
Tanzania	67	2.88	2.66	2.72	2.89	2.8	2.85	3.34
Mauritius	91	2.65	2.51	2.68	2.35	2.69	2.72	2.98
Mozambique	102	2.59	2.45	2.22	2.86	2.38	2.62	2.98
Comoros	114	2.51	2.58	2.27	2.47	2.32	2.67	2.74
Madagascar	137	2.35	2.32	2.16	2.22	2.25	2.42	2.7

Table 1: Madagascar and the neighbouring countries LPI in 2018
Source: World Bank, 2020

1.2 Problem statement

According to Arvis et al. (2010), improving logistics performance have a direct effect on economic activity, such that it has become a priority for many countries. As a nation surrounded by sea, Madagascar's port system plays an essential role for its inhabitants and its economy. The country performs a substantial part of the trade transactions by sea. At the national level, maritime transport is a driving force of the majority of domestic trade, especially for remote regions or areas with difficult access by road.

The land transport mode is in poor condition which accentuates the remoteness of different regions. Moreover, the infrastructure obsolescence (such as railways built during the colonisation period), the high cost condition, the lack of maintenance and the low level of investment had a significant effect on the industry (Gouvernement de Madagascar, 2019). Furthermore, most of the ports are located in urban areas. The traffic-related to ports activities amplify the congestion of the roads, often in poor condition and worsens traffic flow. Finally, these same ports do not have adequate access to their hinterlands to connect appropriately to other cities with a road network on average or imperfect condition.

For an effective transport network, the potential of the transport infrastructure in the hinterland should correspond to ports development. Ports competitiveness should develop perspectives on various opportunities for the development of the economy (Brooks et al., 2014). As such, a country should consider activities generating profits for the port from the hinterland (i.e. warehousing, plant, special economic zone). Iimi et al. (2018) argue that particularly in the African region, transport logistics remains a problem for the agriculture industry. Therefore, the cost of transportation is expensive, or even the transport service does not exist in the region. Moreover, farmers lack the means of transport and have to rely on third parties to deliver the products.

Madagascar is an agrarian country, with almost 80 per cent of the country's population living and relying on agriculture production. However, Madagascar still depends on imports, among which is rice, the staple food of Malagasy people (AFD, 2016). Also, according to the Observatory of Economic Complexity (OEC) (2020), vanilla is Madagascar's top exported product in terms of value, with its production taking place in remote Madagascar regions (such as Sambava, Antalaha, Vohemar, Andapa). Furthermore, Madagascar exports various types of garments, with the majority of the manufactures being located in the capital city, far from the main port of the country. From the above, ports play a significant role as a link to international trade and foster country production.

1.3 Objectives of the study

The maritime transport sector in the daily life of the Malagasy population is significant. However, moving the goods from the place of production to the place of delivery is still challenging, and Madagascar's exportation potential is underutilised.

The objectives of this research are: first, evaluating ports competitiveness in Madagascar on the supply chain, taking as a case study the port of Toamasina. Second, identifying barriers affecting national production transportation. Third, identify success factors of the ports in the neighbourhood and last give a strategic outlook to improve the port competitiveness.

1.4 Research questions

Based on the objectives of this dissertation, three main research questions arise:

1. What is the competitive position of the port of Toamasina and its related logistics?
2. How to improve the integration of the port of Toamasina in the overall supply chain?
3. To what extend can the logistics performance of Madagascar can be improved to leverage the competitive positioning of the port of Toamasina?

1.5 Methodology

In conducting this research, information was mainly retrieved from secondary data. This data was collected and analysed from peer-reviewed journals, academic literature, grey literature and official websites (World Bank, UNCTAD, Government of Madagascar, Port Authority, APMF, Mauritius Ports Authority).

In order to identify the different factors having an impact on the competitiveness of the port of Toamasina, the research analysis was done in four steps. First PESTL analysis for the macro-environment, Porter's Diamond Model to evaluate the meso environment, a benchmarking to compare with ports in the same region and finally SWOT analysis to analyse the microenvironment and to draw conclusions.

1.6 Scope of the study and limitations

Overall, this research is limited to Madagascar LPI compared to the neighbour countries. Also, take the port of Toamasina as a case study. Throughout the research, limitations concern mainly about the reliability and availability of the data and limited time for research.

1.7 Research structure

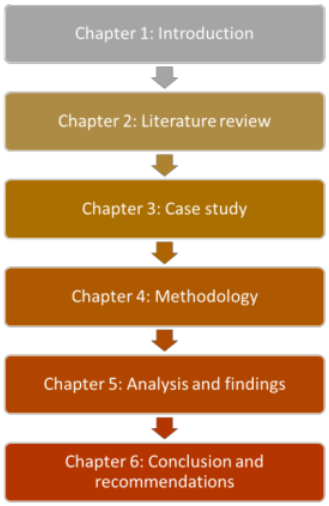

Figure 1: Research structure
Source: Author

CHAPTER 2 LITERATURE REVIEW

The literature review in this chapter focuses on four parts. Beginning with different aspects of competitiveness on broad concepts and narrowing to the port competitiveness. The second part exposes the port integration, showing the importance of the port in supply chain management. The third part presents the logistics performance, and finally give a literature review on the hinterland connectivity.

2.1 Competitiveness

The term "competitiveness" is one of the most commonly used concepts in economics and management; however, its definition varies from author and field. We address in this literature review competitiveness from three perspectives or levels - nations, industries and firms – each requiring different variables for their analysis. Chaudhuri and Ray (1997) have associated the competitiveness of a nation to its ability to have a positive balance of payment. One industry also can gain foreign exchange through exportation in competition with other industries from other nations on the international market. As Porter et al. (2007) argue, the macro environment of the nation will only perceive the real advantage of competitiveness if we improve the microeconomic level. Thus, competitiveness at the firm level is vital for the nation's competitiveness and has to do with a company's ability to maintain a competitive advantage among its competitors.

2.1.1 Competitiveness on the national perspective

From a national perspective, competitiveness is the ability for a country to satisfy the demand of other countries by producing goods and services, and at the same time to provide a high standard of living for its citizens (Buckley et al., 1988). This first definition reflects the importance of the economic indexes such as exchange rates or investment rate as a variable to measure the competitiveness of the country.

Porter (1990) defines competitiveness as output, created by industries, attain and maintain in the market through competition with others in their sectors. Thus, economic prosperity can be driven by companies that are growing. To be more competitive, companies put pressure on the government to support their activities. In this sense, companies define competitiveness by the ability to bring revenue for the nation and not limit the term competitiveness on the macroeconomic level.

Finally, the nation's competitiveness can be defined as all firms' capacity operating in different discipline among the country in the international market. In this case, measuring competitiveness can be achieved by evaluating if firms satisfy the needs of customers by the product or service offered. Krugman (1994) refers to the competitiveness of a nation as follows: "But the major industrial countries, while they sell products that compete with each other, are also each other's main export markets and each other's main suppliers of useful imports."

2.1.2 Competitiveness on the industry perspective

From the industry perspective, competitiveness is compared to the same industries across nations, thus measuring the competitiveness of their nation against other nations. For example, the case of the French automobile industry position after the Second World War was measured by comparing their performance and ability against the American industry position in the market (Sheailan, 1960). Some (Buckley et al., 1988) define the competitiveness of the industry by comparing one specific sector to the international market within the competitive advantage at the possession of the local industry. From the industry point of view, competitiveness is the result of all strategies and operations of all the firms among one specific sector. Moreover, point out that the interactions between the non-business infrastructures (such as educational and training institutions, research and development institutions, governments) and the business firm contribute to the competitiveness of the industry.

The interaction between the non-business infrastructure and the business firm leads to defining the ability of the firms inside the industry to foster competition, in the national or international level and will give new opportunity for growth (Momaya, 1998). Some (Matsumura et al., 2013) defined firm competitiveness in one specific industry following its position in the sector and compared to the global market. This approach usually puts the competitive positioning of the firm against competitors and their relationship within the industry. By using Michael Porter's generic competitive strategies, it is possible to determine the firm competitive positioning and develop a suitable competitive strategy (Tanwar, 2013).

2.1.3 Competitiveness on the firm perspective

From the individual firm perspective, some authors (Maskel and Malmberg, 1999) defining competitiveness by showing the importance of nations on the geographic localisation of their competitors and putting on prior the influence of the international environment, which might affect the firm. For example, Collins and Troilo (2015) explain in their paper the impact of decisions made by policymakers on the regulation. Hence, the potential innovation that a company could achieve change accordingly.

The firm competitiveness is the dynamism of the environment in which a firm is growing, specifically, with competitors' evolution and its impact. For example, the impact of regulation on individual firm, hence measuring their position on the local and international market. Li Sun (2014) explained the evolution of Huawei on the technology market. Huawei took place by first adopting a strategy which allows the company to be competitive in the local market; and after, developed a strategy to expand to new countries which propose soft regulations matching to their needs. In this way, Huawei has the opportunity to be open to the global industry.

Finally, some authors as Chikán (2008) define the competitiveness of the firm as it is an individual entity able to compete on the market, taking into account all factors which might have an impact on the firm. Firm competitiveness is measured through their position on the market, both at national and international levels. Furthermore, Chikán stresses the ability of a firm to fulfil two objectives in the long run: meeting customer requirements and making a profit. At the firm level, the competitiveness of a firm concerns satisfying the demand and at the same time maintaining a competitive advantage over competitors.

2.2 Key factors for the competitiveness of ports

Competitiveness in the port sector is closely related to the application of various and innovative competitive strategies in ports, aiming to attract new customers. The port industry is facing changes which require proactive approaches, and should not limit the present and future demand (Frankel, 1987). Instead, ports should also incorporate more technologies that enable to better integrate with the transportation network and port systems, as well as increasing workforce productivity, social impact and how to use the port premises efficiently. Moreover, Paixão and Marlow (2003), suggest ports to be more agile thus to have the ability to compete efficiently with other ports, meanwhile ensuring the role of a node in transport chains.

Port competitiveness can be affected by two different channels: access to transport networks, and economic and regulatory issues. Transport network access conditions deal with logistics for the maritime accessibility to the port (such as the operational capacity of the port) and the logistics related to the accessibility from the land transport (as the availability of transport network to the port). Economic and regulatory issues are related to the economic factors such as domestic regulation, and the regulatory frameworks as the legal certainty applied by the customs authorities (UNCTAD, 2019).

According to Notteboon and Yap (2012), factors having impact on the port competitiveness are gathered in the eleven following points: (1) the proximity of the port to the place of production, the final consumer and the major trade lane, (2) a good quality of maritime and hinterland access which allow connection to a large market, (3) ability of the port to reduce the cost tariff through a high operational productivity, (4) ability to propose value added services to the users (shipping companies, shippers) of the port, (5) ability of the port to adapt the future market demand with the logistics in their possession, (6) the ability of the users to compete with different modal transport, (7) the ability of the port to adapt with the evolution and requirement of the logistic, (8) ability of the port to take advantage on the relationship inside of the ports range, (9) involvement of the private sector on the terminal operations, (10) lever of the local economy, (11) strong interaction between stakeholder and the community for the development of the local economy. These key factors vary following the port; however, the competitiveness of the port depends on the range of competitive advantage ports gain to compete with its competitors, and as each port is unique, all of these factors may not be applicable for other ports (Notteboom and Yap, 2012).

Finally, Heaver (1995) stressed the importance of moving the port industry on harmonised policies referring to economic principles by adopting international standards for the cost recovery from the port's users. On their side, Song and Yeo (2004) mentioned the importance of attracting new customers but also maintaining them. Moreover, to be competitive among other competitors, the port has to bear in mind different factors such as the volume of cargo throughput, the quality of the services, up to date equipment, tariff services, the geographical location of the port.

2.3 Competitiveness of ports as node in the supply chain

We analysed earlier ports as individual entities. Nevertheless, in recent times, according to Pettit and Beresford (2009), we consider ports as crucial components in international logistics operations. Ports are nodes in the global transport network, and the performance of one node in the network influences the performance of others.

Furthermore, ports competitiveness also depends on the interconnectivity of different actors (shipping companies, freight forwarders, the port/terminal operators) which are interdependent. In this sense, the port competitiveness should be taken on a holistic point of view to gain benefits from the competitive advantage among the port environment (Bichou and Gray, 2005). The competitiveness of a port does not rely only upon its infrastructure, nor services and activities happening in the port, but also on the quality, quantity and fluidity of the movement along the supply chain (De Martino and Alfonso, 2008).

According to Notteboom and Yap (2012), ports competitiveness must therefore be viewed from a supply chain perspective, entailing the analysis of the port into the transport network. Port competitiveness also encompasses its accessibility and connection to the hinterland via other modes of transport. Thus, it is challenging to describe competition since several variables affect it. Parola et al. (2017) argue that the drivers to port competitiveness result from significant changes in the maritime industry, namely economies of scale in shipping, port governance, coopetition between ports in proximity, inter-firm networks, and green and sustainability challenges. These drivers lead to the adjustment of the importance of the port strategy, which is implemented and coordinated by Ports Authorities.

2.4 Ports integration

As first gateways for the economic development of the country, ports have to fulfil requirements from ships and other transport modes. Song and Panayides (2008) postulate the importance of measuring the integration of the port in the supply chain to understand ports competitiveness. Therefore, the authors conceptualised measures for the port integration in the supply chain, studied the repercussions of the integration in the supply chain of the port and define its competitiveness. These measures could help to evaluate the situation of the supply chain management, thus to correct and improve its implementation but also to take the right strategy along the chain.

To evaluate the integration of the port, Song and Panayides (2008) put the six following parameters:

2.4.1 Use of technology for data sharing

Ports are putting available electronic links between suppliers and customers, thus to reduce the time for the shipping transaction along the chain. These links allow all partners to transmit orders, invoices, shipping notifications. Also, to have real updates on the movement of the cargo along the chain. In this sense, all information between partners will be available and used as a competitive advantage.

Nevertheless, (Hoyt and Huq, 2000) show that sharing information and communication requires trust between the partners. Furthermore, Harrison and Van Hoek (2008) reinforce that to attain a goal and achieve the plan, the relationship on vertical integration needs sharing information, group work, even though all parties are independent, and must of all have to ensure trust and communication.

2.4.2 Relationship with shipping lines

Building a relationship with shipping lines opens the way to sustainable benefits for all the partners involved. Solutions proposed, in comparison to other firms adopting traditional transactions, are at the same time practical, efficient and relevant which increase the profitability of the firms in the supply chain (Kalwani and Narayandas, 1995). For example, Bichou and Gray (2004) show that ports have the interest to work with other organisations because of different requirements efficiency and operations.

2.4.3 Value added services

This parameter depends on the ability to provide facilitation to the users of the port. The value-added service involves the operations, services and capabilities occurring in the port premises such as providing access to hinterland and foreland for road/rail, customised services, different services for the intermodal transportation. According to Golicic (2007), to have a successful relationship between partners, all parties should have a better understanding of the other objectives. Each organisation can affect the cargo's flow (speed, quality of the service, flexibility).

2.4.4 Transport mode integration

Ports receive goods both from sea and land. According to Song and Panayides (2008), these goods are distributed through different transport modes, which require coordination between the port's system and the different systems of transportation. However, the port should have the ability to interact with them among the port premises. The final aim of shippers is to insure the cargo will arrive at the end-user in less time at lowest costs. Therefore, ports should be able to propose different accessibility to arrive in the market.

According to Álvarez-SanJaime et al., (2015), as the competition among containerisation and port commercialisation became fierce, firms adopted strategies towards gaining power across the supply chain and compete efficiently for freight transport services. Among these strategies, is the port integration to the inland transport modes. This last can be a gain for the port in terms of cost; however, it is only efficient for long-distance transportation in the hinterland as it will be expensive for the destination close to the port.

2.4.5 Relationship between the port and inland transport providers

In a similar vein as the relationship between the port with the shipping lines, the port should be able to build and encourage networks with different partners such as regional port authorities and market participants. This relationship will allow improving the distribution relatively on the cost and the flow of the cargo. According to Notteboom (2008), because ports seek to increase their cargo throughput, produce more benefits and increase the value-added services, ports have to work with transports operators and service providers. In this sense, these lasts are actors for moving the cargo from the hinterland to ports.

The port as a node in the supply chain interacts with other system transportation which are beyond their premises. Therefore, port integration depends on the ability of the port to propose different connectivity options for the users. The interaction between ports and the different transportation modes should be monitored for the benefits of the chain and to increase its competitiveness.

2.5 Logistics performance

Logistics is a crucial component of the supply chain process. According to Panayides and Song (2013), it involves different stages from planning and development to control the processes efficiency and to follow information from the storage of the goods and services along the chain. Hence, these actions lead to the efficiency of logistics and fulfil customers' requirements.

Erkan (2014) mentions that logistics require implementation at the correct place, at the correct time and for the correct users and in the right condition. Also, this process implicates different actors to work together through coordinated activities and strategies, thus giving opportunities to generate employment and define the competitiveness of one country. Moreover, an efficient logistics strategy accelerates the growth of a country as each activity along the chain generates profits.

The International Transport Forum (ITF, 2015) raised the importance of logistics performance, mentioning that international production relies on transportation but also the quality of the logistics used for trading. Value-added generated along the supply chain depends on transportation performance, but also the quality of the logistics proposed by the country, in domestic premises or on the international range. Besides, the report also mentioned the significant role of the government through their involvement, decisions and policies.

Even though private sectors mainly perform logistics, logistics performance belongs to the public interest, on each level (governmental, regional, international). As efficient logistics systems lead to a sustainable country economic growth, the public sector must identify and understand each actor and activities in the chain logistics to improve its efficiency. Understanding and measuring these components will allow the country to build policy and implement strategic interventions to address challenges and take the opportunities (Havenga, 2010).

In this sense, several countries developed a comprehensive national logistics strategy to leverage their international trade (ITF, 2016). Moreover, the public sector has its obligation to create adequate structures to make the trade easier. The overall performance also depends on government interventions such as infrastructure, logistics services and cross-border trade facilitation (Arvis et al., 2014).

On their side, the World Trade Organisation (WTO) mentioned the importance of trade facilitation. This last, by WTO definition, means the "simplification and harmonisation of international trade procedures". By suggesting different standards, WTO is trying to mitigate the "red tape" existing in developing and developed countries. As there is a lack of transparency and no uniformity in trade, the red tape creates a gap between traders and official agencies.

The logistics performance of a country is essential to the competitiveness of a nation, but also, it is a parameter for opening the opportunity for foreign investment. Better logistics facilitate more access to markets and therefore enhance economic activity. Wiederer (2018) argues that one of the key reasons for companies to refrain from expanding their procurement network to emerging and developed countries is a deficiency of logistics infrastructure. Also, Hausman et al. (2005) demonstrate the higher cost implied in terms of time and price because of the inefficiency of the logistics hence affecting both companies and countries

2.5.1 Maritime connectivity

One factor determining the level of integration concerning the global market depends on a country geography localisation. More specifically, on the localisation of a country in relation to the global container shipping network (UNCTAD, 2019). In this sense, UNCTAD developed the Liner Shipping Connectivity Index (LSCI) which is conducted a country classification of maritime connectivity. This ranking enables assessment of the country's degree of incorporation into the maritime transport navigation network, and thus evaluate its capacity to access (containerised) foreign trade.

With the LSCI, countries can see if their position is getting worse or they are more integrated compared to the previous year. This index is based on six components namely: (1) number of vessels calling the country per week, (2) annual throughput capacity in TEU dedicated to the country, (3) number of regular liner shipping services coming to and from the country, (4) number of shipping companies providing services to and from the country, (5) average size of vessel serving the country, (6) number of countries connected directly to the country through direct liner shipping companies. From the above, the level of integration to the index also evaluates the competitiveness of a country on the global maritime freight transport. Through the evaluation results in an overview of the capacity, modal transport and frequency of vessels connecting and available in the country (UNCTAD, 2019).

According to Wilmsmeier and Hoffmann (2008), the more a country is far from the main shipping routes, the higher the freight rate is. However, being far from the main route exposes a country on an oligopolistic market. Thus, countries in the same region are competing with each other to attract more shipping lines to reduce the freight cost. Moreover, according to Fugazza (2015), the absence of a direct connection between two countries in a bilateral contract is correlated with a decrease in export value ranging from 42 to 55 per cent.

The port connectivity allows the evaluation of the connection of one port to others in the maritime transportation network.[1] According to Jiang et al. (2015), the higher a port connectivity level is, the more a port will attract new users. Hence, it will advantage shipping companies in terms of transportation of the cargo, for example, at a low price and timeliness of transportation. These advantages will affect the competitiveness of one port comparing to other ports competitors. However, the level of port connectivity depends also on the dynamism of a port with other ports, specifically if a port belongs to a range or share the same trade route or geographical region. Lam and Yap (2011) demonstrate the complementarity between ports belonging in the same region and sharing the same trade routes.

2.5.2 The Logistics Performance Index

The World Bank developed the Logistics Performance Index (LPI), a benchmarking tool, allowing different countries to define challenges and opportunities in their trade logistics. Through the LPI, countries can take decisions on what to do and improve the country competitiveness in comparison to other supply chains (World Bank, 2018). In international trade, the relationship between logistics and transportation becomes more significant. The LPI allows traders, policymakers, and other stakeholders to evaluate and have perceptions of the country's logistics through the data of the environment of general cargoes' transportation in six main indicators (Arvis, 2018). The LPI is based on the following indicators; (1) The efficiency of customs and border management clearance; (2) The quality of trade and transport-related infrastructure; (3) The ease of arranging competitively priced international shipments; (4) The competence and quality of logistics services; (5) The ability to track and trace consignments; (6) The frequency with which shipments reach consignees within the scheduled or expected delivery time (Arvis, 2007).

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[1] A possible measurement of connectivity is UNCTAD's the port liner shipping connectivity index.

2.6 Hinterland connectivity

As the port belongs to supply chains, it does not compete only with over ports but also on all the transport chains (Notteboom and Winkelmans, 2001; Robinson, 2002). The hinterland connectivity, one element of the chain and linked to the port, plays a significant role as a critical success factor for the port (De Langen, 2004). Mainly, the delimitation of a port hinterland is not defined as it depends on the different factors such as the commodities to transport, the period the market is evolving and the transport mode (Notteboom, 2008).

The efficiency of hinterland connectivity depends on the cooperation of different actors, in the public and private sectors. Horst and De Langen (2008) mentioned that to have an effective hinterland transport chain, shipping lines, terminal operating companies, forwarders, hinterland transport providers, and inland terminal operators must work in coordination with port authority, customs, and infrastructure managers.

Hinterland transportation requires the exporter or importer to move the cargo from or to the hinterland using an intermodal carrier from or to the seaport through different means of transportation. During this operation, on the one hand, the importer or exporter seeks to minimise the hinterland cargo costs. On the other hand, the seaport and intermodal carriers seek to maximise the cargo throughputs and the profit on the handling cargo costs. Also, the cargo in the hinterland will pass through different stages (Talley and ManWo Ngb, 2017).

The transportation sector seeks to improve the cost-effectiveness of the chain by ensuring value-added services. However, this work requires the respect of regulation on the environment. For example, in one study by Ambraa, Carisc and Macharisa (2018), the possibility for the unification of the physical internet and synchromodal transport, which not result to the integration of these two dimensions, but offer perspectives for the transportation industry to coordinate with the physical internet to be more competitive. Also, logistics service providers are keen on shippers' choice behaviour concerning modal transport. The shippers require putting on consideration different factors such as the distance, CO_2 emissions, or different services as parameters (Chang and Thai, 2017).

Integrating the inland to the sea transportation became inevitable. Thanks to the containerisation and the evolution of technology, combining the sea transportation and inland transportation became possible. Even though the inland capacity transportation is less than the ability of the containership, carrying large cargo and making them working closely together became possible with containers (Panayides, 2002).

While the world's most important cities localisation are along the coast and function as gateways to global trade, there are also a large number of cities in the hinterland. These cities function as major economic centres, serving consumers and organising as hubs for regional resources. The hinterland connectivity allows seaports to connect, serve and build opportunities to the whole network inside a country. According to UNCTAD (2008), there are four different types of transportation. Concerning the hinterland connectivity, there are three modes of transport, namely: the road, the railway and waterway transportation.

2.6.1 Road transportation

Road transportation is the transport of goods primarily using trucks, and their primary network is roads. It is a more commonly used method of covering serving the hinterlands, transporting general cargo, containers, dry or wet bulk, and dry break bulk. Although roads were established to serve non-motorised modes of transportation, it is motorisation that has influenced its growth much since the early 20th century. In road construction, however, physiographic limitations are essential, with considerably increased costs to address challenges such as rivers or difficult surfaces (Rodrigue, 2017).

Many problems come from the use of road transport, for example, road congestion, infrastructure demand and environmental and safety concerns, mainly where there is no coordination of its components and trans-country outreach for the overall network (Acciaro and McKinnon, 2015).

2.6.2 Railway transportation

In order to mitigate congestion on road transport and optimise traffic density economies, one of the most frequently proposed strategies is to switch from road transport (trucks) to rail and inland waterways' (Acciaro and McKinnon, 2015). According to Van den Horst and de Langen (2008), first, these transportation modes are more environmentally friendly but expensive and complex as it requires coordination work between the private operators and public authorities. This coordination requires the establishment of policy action.

Second, some problems related to management occur in container rail transport: mismanagement space and congestion, frequently combined in the issue of high load, delays due to inadequate preparation on rail terminals and insufficient traction and rail freight exchange. Moreover, Kany and Chen (2017) stress the importance of railways connectivities and consider this transport mode as one tool to achieve the competitiveness of the port. The authors specially mention that the port competitiveness challenge is not only on the port operational function but also, how efficiently this port can spread the cargo across different regions.

2.6.3 Waterway transportation

Size economies are possible to attain and can also be better in inland waterway transport than in rail transport. Therefore, intermodal inland waterway transport can be more cost-efficient than road transport. The cost-efficiency of inland waterway transport is the primary cause for switching from road to inland waterway transport. However, the terms of a competitive advantage-operation framework within the transport chain, using this transport mode is often not discussed in-depth, driving to inconsistent findings or estimated cost figures. That is, costs are considered as an average of all activities in the intermodal transport market, instead of having accurate costs that represent an examination of the particular case (Wiegmans and Konings, 2015).

2.6.4 The repercussions of the hinterland connectivity on the port

Different authors demonstrate the repercussions of hinterland connectivity and port competitiveness. Zhang (2009) argues the effect output quantity on a port and the port competitor. Because ports compete in amounts of cargo, a rise in a region's corridor capacity would increase a port production, hence increase its benefits. Meanwhile, it will decrease the volume of the competitor port. Some scholars such as Noteboom (1997), and Fleming and Baird (1999) advance that having access to the hinterland is one of the main factors shaping a seaport's competitiveness as it competes with other seaports.

As mentioned earlier, thanks to technology, transportation from different places became possible. Generally, we saw proximity as the variable that could better represent a seaport's economic repercussion on land. Nowadays, the better a port's link to the different inland markets, the greater the ability to extend to new regions as a whole. Also, the higher the constraint such as bottlenecks, delays or accessing the hinterland, the slower the flows inland.

In Ferrari, Parola and Gattorna (2010) study, the authors demonstrated the importance of the penetration capacity of a port in the country among the competitiveness with other ports belonging to the same region. Their research showed that the potential demand for one country's ports could be greater than the regions currently served if only we improve the intermodal connectivity. For example, by improving the railway network and decreasing time spent on different formalities, avoiding conflicts and differences of point of view in the organisation of the distribution among the organisation itself.

CHAPTER 3 CASE STUDY: MADAGASCAR AND THE PORT OF TOAMASINA

This following chapter presents the current situation of Madagascar on economic view. After, presents the different trade agreements with which Madagascar is involved, and the major exportation of the country with countries destinations. After, the paper presents the port of Toamasina, the management of the port and future projects of the port.

3.1 Economy

The Gross Domestic Product (GDP) of Madagascar is ranked relatively low, with USD 14 billion in 2019. With a total population of 26.9 million in 2019, the GDP per capita increased to USD 500; Madagascar is one of the world's poorest countries thus a low-income economy according to World Bank's classification by the Gross National Income (GNI) (World Bank, 2020). Figure 2 shows the average annual growth rate for the population and the GDP per capita. The growth rate over the past three years was about 4.5%, slightly higher than the 3.1% population growth rate. Although global growth dropped from 3.6 % in 2018 to 2.9% in 2019, Madagascar's economic growth stood at 5.0% after 4.6% in 2018 (Banque Centrale de Madagascar, 2019).

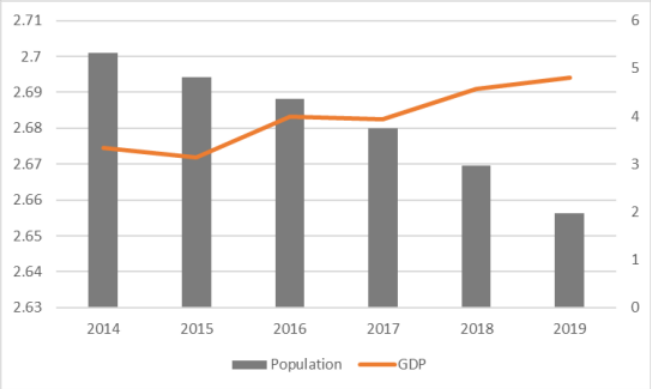

Figure 2: Madagascar GDP and population growth
Source: World Bank 2020

According to the World Bank (2020), COVID-19 pandemic affects Madagascar. Because of the Coronavirus, the growth of Madagascar's economy dropped to 1.2% due to the decrease in tourist arrival, external demand diminishing, and domestic containment measures. Also, according to World Bank (2020), Madagascar projects to rebound about 5.6% in 2021 and at the same time, reduce the country's level of poverty.

3.1.1 The integration of Madagascar in international trade

Currently, Madagascar is part of several trade agreements and arrangements:

- As of 17 November 1995, Madagascar has been a member of the World Trade Organization (WTO). Madagascar grants at least most-favoured-nation treatment to all its business partners;
- Madagascar is a founding member of the African Union (AU) and belongs to two of the eight regional economic communities, namely the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC) (Malagasy Customs, 2020);
- Madagascar is one of 79 countries in the African, Caribbean and Pacific (ACP) community of states in which the Cotonou Agreement was signed by the European Union (EU) in June 2000. Madagascar benefits from the 'Tout sauf les armes' (TSA) regime, an initiative implemented in February 2001 by the Council of the European Union, which arranges an asymmetric trade relationship in favour of the Least Developed Countries (LDCs) by offering them duty-free, quota-free and unconditional reciprocity access to the Community market;
- Even though the EU is by far the primary customer of Malagasy products, exports to the North American Free Trade Agreement (NAFTA) member nations experienced significant growth in 2017. Following the United States decision to reincorporate Madagascar into its Africa Growth and Opportunity Act (AGOA), a preferential trade program (Malagasy Customs, 2020).

- Several countries, under the Système Généralisé de Préférences (Generalized System of Preferences, GSP), grant preferential but non-reciprocal tariff treatment to goods originating in Madagascar, such as Canada, China, India, Japan and Morocco. Also, Madagascar has signed bilateral trade agreements with some fifteen countries. These agreements set out a general collaborative platform in trade matters without tariff preferences being granted.
- Madagascar is an Indian Ocean Commission (IOC) member, as well. The IOC, even if it does not constitute an economic community, represents a regional lever for the development and regional integration of its member countries (Malagasy Customs, 2020).

3.1.2 The various trading partners

Madagascar exports various types of commodities and finished products. Exports include a significant proportion of manufactured goods and raw materials, ores and precious metals, shrimps and agricultural products (vanilla, spices, lychees). However, the island reported a negative trade balance of 724 million USD in 2018, with 3.48 billion USD of products and services exports and 4.2 billion USD imported goods and services (OEC, 2020). In 2019, as shown in Figure 3, exports and imports account for 26.5% and 33.4% of GDP, respectively (World Bank, 2020).

Figure 3: Madagascar importation and exportation as a percentage of the GDP
Source: World Bank, 2020

After 2016, Malagasy exports have focused steadily on those products: vanilla ($945 million), raw nickel (US$ 429 million), cobalt (US$ 234 million), textiles (knitted sweaters, US$ 159 million) and cloves (US$ 158 million) (OEC, 2020).

The major exportation countries include France, the United States, Germany, China and Japan (OEC, 2020). While exports to Asian countries have experienced significant growth, France's market share has declined sharply between 2010 and 2015. Exports from Madagascar to countries such as China, India and South Korea have thus witnessed an average increase of over 25% over the period 2010-2015; exports to African countries such as South Africa (+32%) and Kenya (+27%) also show strong growth (UNCTAD, 2017). The following Figure 4 shows the share of Madagascar's exportation by country from 2014 to 2018.

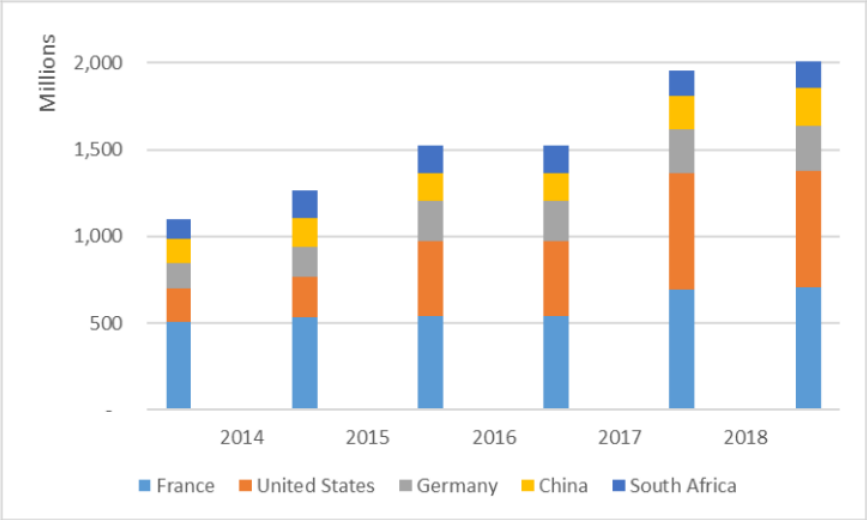

Figure 4: Madagascar's exportation by country
Source: OEC, 2020

3.2 Toamasina's port

The port is located at the east coast of the island, 360 km from the capital city Antananarivo. The port provides about 35% of the total work for the population in the city and indirect jobs in different sectors (e.g., banking, insurance). About 90% of the container cargo in Madagascar pass by the port of Toamasina. In this sense, the port is considered as the economic lunge of the country (SPAT, 2020). The infrastructure and supra-structure of the port can handle different types of cargoes, such as containers, dry and liquid bulk, roll on–roll off (Ro-Ro).

Toamasina port is the main port of Madagascar. The Ministry of Transport, Tourism and Weather (MTTW), the "Agence Portuaire Maritime et Fluviale" (APMF) and the "Société du Port à Gestion Autonome de Toamasina" (SPAT) are the institutions in relation to the port on behalf of the state. Overall, the MTTW takes in charge jurisdiction for all modal transports (ports, marine, river transport, air transport and railway transport). After, APMF is the public corporate entity and in charge of regulations related to the maritime areas, harbour and rivers. Moreover, APMF has the duty to control ports rehabilitation, development and maintenance of the infrastructures (harbour, rivers, navigational routes). Finally, the port is a landlord port under the management of SPAT. This last is the public port authority dedicated for Toamasina port. In this sense, SPAT manages the port safety, dredging port, maintenance, constructions of the port facilities.

Related to companies operating the port, Madagascar International Container Terminal Services Limited (MICTSL) is the terminal container operator. The "Société de Manutention de Marchandises Générales" (SMMC) is the terminal operator for general cargoes, and Galana Plateform Terminal Petrolier (PTP) is in charge of oil terminal management.

Toamasina's port projects

To enhance the port of Toamasina competitiveness, SPAT has engaged in different projects in cooperation with the Japan International Cooperation Agency (JICA). Through these projects, the port of Toamasina expects to increase the cargo volume, improve the productivity of cargo handling and stimulate mineral resource transportation from Ambatovy (80 km far from Antananarivo, the Capital city of Madagascar). SPAT and JICA signed an agreement since 2017 to conduct the following construction with a completion date of works in 2026 (JICA, 2017):

- Extension of the breakwater (up to 345m in length)
- Construction of the Container Berth C4 with a length of 470m and a draft of 16m
- Extension of the container yard (up to 10ha)
- Deepening of the Container Berth C3 (up to 16m in depth)
- Deepening of the Bulk Cargo Berths C1 and C2 (up to 14m in depth)

CHAPTER 4 METHODOLOGY

This chapter addresses as to how the analysis is conducted in order to answer the research questions. The methodology is conducted in four steps. First, the analysis focuses on the macro environment by using the PESTL approach as a tool for the analysis. After a definition of the macro environment, the analysis focus on the meso environment by using Porter's Diamond model. A benchmarking analysis is conducted to understand the competitive positioning of Madagascar and the port of Toamasina. Finally, the analysis employs a SWOT analysis to integrate the previous results against the microenvironment of the port of Toamasina.

4.1 PESTL analysis

The PESTL analytical framework scans the macro-environment factors affecting the environment of a business. It consists of surrounding the political, economic, social, technological, and legal areas (Kotler, 2001). Through this analysis, the framework allows users to grasp how the macro environment impacts the meso- and micro-environments of the organization under analysis.

4.2 Porter's Diamond model

Porter's Diamond model is a strategic management tool for helping one organisation to analyse and define the organisation competitive advantage across the environment where it is involving. The tool has four determinants which interact with each other, namely: factor conditions; demand conditions; related and supporting industries; firm strategy, structure and rivalry. The two-way interactions between all variables generate the system dynamics (see Figure 5).

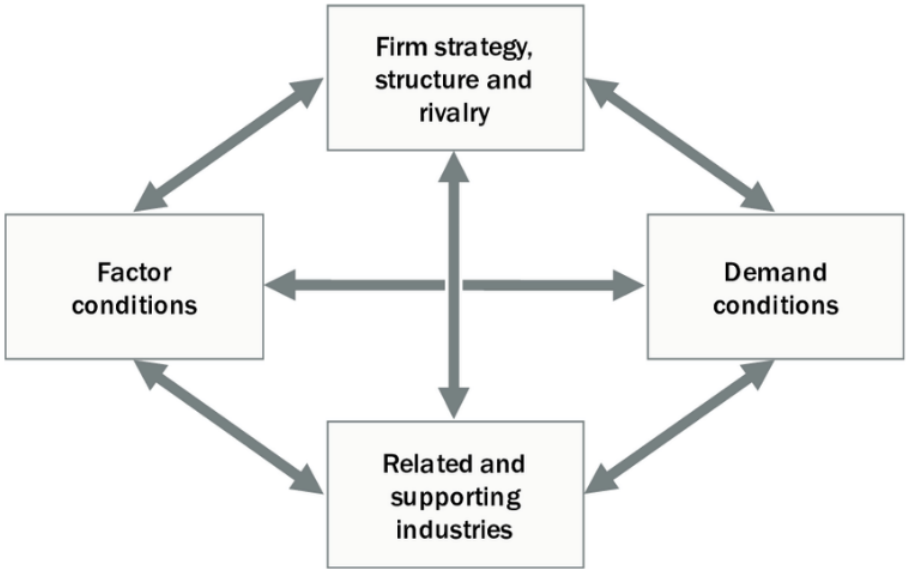

Figure 5: Porter's Diamond Model
Source: Author

4.2.1 Factors Conditions

Factors Conditions are related to standard economic theory which determines the flow of a country trade. The value and trade flow depend on the quality of these factors. It is important to stress that nations success depends on how a country use these factors, and how to innovate on this factor in order to achieve a competitive advantage. Table 2 presents the indicators used in the factor determinant for the study, in particular, institutions, foreign direct investment and labour market efficiency.

Indicators	Description
Institutions	The legal and administrative framework within which individuals, firms, and governments interact to generate wealth.
FDI inflow	Foreign direct investment inflow that is usually measured in relation to the GDP.
Labour Market Efficiency	Degree that workers are allocated to their most effective use in the economy and provided with incentives to give their best effort in their jobs.

Table 2: Factors conditions
Source: Adapted from Chung (2016)

4.2.2 Demand Conditions

The Demand Conditions reflect the need for the home market of a country. These factors allow companies to be proactive and produce goods and services related to the demand. In Table 3 the two indicators used to analyse this determinant: GDP and GDP per capita.

Indicators	Description
GDP	Gross domestic product
GDP per Capita	Gross domestic product per Capita

Table 3: Demand conditions
Source: Adapted from Chung (2016)

4.2.3 Related and Supporting Industries

The Related and Supporting Industries should be internationally competitive to gain a competitive advantage. As it is named, this determinant give supports on the efficiency of one industry (i.e. time, cost). The importance of this determinant also relies on their accessibility and the quality of interaction with the industry. Table 4 presents the different indicators used to define this determinant in the context of this study.

Indicators	Description
Quality of Air Transport Infrastructure	The quality of air transport infrastructure of a country
Quality of Railroad Infrastructure	The quality of rail transport infrastructure of a country
Quality of Port Infrastructure	The quality of port transport infrastructure of a country
Quality of Road	The quality of road transport infrastructure of a country

Table 4: Related and supporting industries
Source: Adapted from Chung (2016)

4.2.4 International Firm Strategy Structure and Rivalry

International Firm Strategy Structure and Rivalry reflect the creation, organisation, management and the competitivity of companies among a country under the national conditions and context. Table 5 shows the different indicators used to define the International Firm Strategy Structure and Rivalry.

Indicators	Description
Starting Business	All procedures officially required for an entrepreneur to start up and formally operate an industrial business
Pay taxes	The taxes and mandatory contributions that a medium-size company must pay a given year as well as paying taxes and contributions
Protecting Minority	The protection of minority investors from conflicts of interest through one set of indicators and shareholders' rights in corporate governance through another
Registering Property	The full sequence of procedures necessary for a business to purchase a property from another business and to transfer the purchase title to the buyer's name

Table 5: International firm strategy and rivalry
Source: Adapted from Chung (2016)

4.3 Benchmarking

The benchmarking is a method of comparing and evaluating the performance of an organization or product with the competitors. The objective of benchmarking is to identify internal opportunities to improve the competitive position in the market. To do so, it requires to analyse the advantage of the competitors and adapting the elements leading to the improvement.

4.4 SWOT analysis

The SWOT analysis is a tool used to evaluate the environment on which the organisation can interact. The SWOT can be dived in two groups, the external and internal environment. The external diagnosis includes elements not controlled by the organisation: Opportunities (positive elements of the environment) and Threats (negative elements of the environment). For internal diagnosis, it represents the elements that can be controlled by the organisation: Strengths (positive elements of the company) and Weaknesses (negative elements of the business).

The elements to be studied are the performance of the company (such as marketing, organisational structure) and in-depth analysis of product performance, pricing policies, distribution and communication.

CHAPTER 5 ANALYSIS AND FINDINGS

The main objective of this chapter is to analyse the competitive position of the port of Toamasina. In the first part, an analysis of the macro-environment is undertaken using the PESTL framework. After, the meso-environment is assessed using Porter's Diamond model. A benchmarking is conducted comparing the competitive position of the Port of Toamasina with Port Louis (Mauritius) and Port of Beira (Mozambique). The analyses condensed and expanded into the micro-environment through an applied SWOT analysis for the port of Toamasina. Finally, this chapter presents different strategies to improve the competitiveness of the Port of Toamasina by enhancing its logistics performance.

5.1 PESTL analysis

5.1.1 Political

Since its independence in 1960, Madagascar's political climate has undergone recurrent instabilities. The last crisis politic was at the beginning of 2009 and put Madagascar in the transitional government for five years. From 2019, Madagascar adopts development based on globalisation while maintaining the country's values and interests. The country applies "social liberalism" and becomes an international market economy. At the same time, Madagascar keeps track to restrict factors undermining the local market by introducing social measures such as enhancing the quality of labour market.

The current government aims to make Madagascar an exporter of value-added products. In this sense, Madagascar is working to: implement processing plants for raw materials, support and intervene in different regions with an efficient governance policy and establish e-governance, introduce foreign international cooperation and new technology – thus, aiming to catch up the economy and businesses to the level of most countries of the world.

5.1.2 Economic

Different experts (e.g., Fournet-Guérin, 2010; Kubota, 2015; Razafindrakoto, Roubaud and Wachsberger, 2017; UNDP, 2019) have shown the Malagasy economy's paradox: a territory abundant in biodiversity and natural resources but marked by poverty. The main obstacles found for the country's economic development are due to political instability and the low share of tax revenue (about 10.4 per cent of GDP), which do not permit financing for sustainable development for the population (IMF, 2020); along with deficiencies in energy production, transport constraints (costs and quality of services) and consequent dependence on external funding.

5.1.3 Social

The capital, Antananarivo, has a high population density, with more than 7 million inhabitants, it accounts for almost 28 per cent of the total population of the country. Analamanga and Vakinankaratra regions (belonging to Antananarivo province) account for over a quarter of the total population (INSTAT, 2020). The east coast between Manakara and Toamasina is the second heavily populated region, after the highlands, with a density of between 50 and 100 inhabitants per square kilometre. This unequal distribution of the population with the territory has a direct effect on the labour availability (qualified or not), and consequently for the economic development of the country.

5.1.4 Technology

Activities focused on Information and Communication Technology (ICT) is important for the economic development and job creation. The majority of the population remains engaged in agriculture. Instead of improving the quality of the agriculture with technology, farmers use conventional cropping methodologies.

The hydrocarbons sector is thought to be underexploited. Madagascar has onshore and offshore sedimentary basins, in which only 45 per cent have been the subject of exploration work. Currently, the country imports all hydrocarbon-based products (fuels and energy fuels) due to a lack of technology for the exploitation and processing (refinery) of these hydrocarbons (PEM, 2019).

5.1.5 Legal

According to the 2010 Constitution, Madagascar is based on a system of regional decentralised bodies, composed of six provinces, themselves divided into 22 regions. Mayors for municipalities, heads of regions and heads of provinces are the primary contacts for investors and economic players who operate on these territories. In the port sector, law no. 2003-025 defines the Ports statutes, in which the management of ports is transferred to the Province authority where they are located. Article 11 indicates that in matters of public domain, the Autonomous Provinces/Regions, in ports of local interest, have the same rights and obligations as the State.

Madagascar does not have a National Port Master Plan, which represents a constraint to promote Madagascar maritime industry. The National Port Master Plan should be used as a reference document on the recognition, forecasting, arrangement and spatial distribution of port facilities in the national territory in the short-, medium- and long-term planning and programming of the projects. According to the United Kingdom (UK) Department of transport (2012), national policy dedicated to ports is essential for the organisation of Maritime Management. The National Port Master Plan should be implemented to ensure the maritime and coastal management. In this sense, it allows the country to decide on other port development projects, and for local planning authorities which role to play. It also refers to related construction, such as road and rail connections, wherever applicable, for which permission is obtained in parallel of the country development.

5.2 Porter's Diamond model

5.2.1 Factors condition

The political and economic context of Madagascar described before is a major hindering factor for both the national competitiveness and promoting the dynamism productive firms in the country. Barriers to entry (regulatory and non-regulatory) are high, which make the entrance of new firms to the market difficult (World Bank, 2020). This situation leads firms to employ their resources in finding ways to cope with regulations rather than using these resources to enhance their productive capacity. In this sense, firms have employed a strategy to adapt to the environment and keep their competitiveness against companies having the majority of the market share.

Both in the domestic economy and trade, Foreign Direct Investment (FDI) has a significant role for the country. Madagascar has been increasingly receiving FDI, which has been mainly focused on high performing sectors. The existence of high quality of natural resources in Madagascar, intertwined with cost-effective labour, and a good internet connection as led the inflow of FDI to grow. This investment has been especially visible in the extraction of natural resources such as Nickel, Cobalt and other minerals, but also important to raising the potential of agribusiness, technology and human development capacity. Even though the economic instability has occurred in the country, these resources make Madagascar in a good position as an exporter economy.

According to the World Bank (2020), although the workforce in Madagascar is fewer than recent emerging economies (Malaysia and Rwanda), the workforce in Madagascar is more than other countries (Burundi, Ethiopia) having the same characteristics in terms of income and education level. Labour is highly available, with about 90 per cent of men and 85 per cent of women being aged between 15 and 64 years old and thus active in the labour market (World Bank, 2020). Also, approximately 480,000 young people are entering the labour market annually. However, only 38,200 formal jobs (annually) have been created between 2014 and 2018. In general, service sector generates the most significant number of employment (52%), followed by the manufacturing sector (35%) and finally the primary sector (13%) (World Bank, 2020). Creating enough jobs that can offset the high unemployment registered in the country remains a challenge. In particular, having enough job opportunities for those who enter the labour market every year, while at the same time raising the level of human capital in the labour market are significant challenges in the country's economy.

5.2.2 Demand condition

Madagascar is currently more involved in the global economy than before. Furthermore, the performance through lasts years lead to the increasing of the GDP from 22% (2009) to 35% (2017). Reintegration to some agreements, such as the AGOA, raised value-added both for services and goods exports, also attracted new FDI (World Bank, 2020). However, logistics challenges related to international trade remain present, both on the labour market and transportation.

Madagascar has experienced a long-term decrease in the population income, as the country is 41 per cent poorer today than it was at independence in 1960 (Razafindrakoto, Roubaud and Wachsberger, 2017; World Bank, 2020). The World Bank (2020) estimates that 77 per cent of the population live below USD 1.90 per day. The unemployment and the informal sector are high, and the quality of human capital is limited to the market.

5.2.3 Firm structure and rivalry

Madagascar is ranked at 80 among 190 economies in starting a business. With a score at 88.5 (0-100), Madagascar is behind Mauritius with a 94.5 score and ranked at 20, but above the regional average (80.1) in Sub-Saharan Africa (Doing business, 2020). Earlier, the business environment in Madagascar was in a weak position. Mostly because of users' perception of governance effectiveness and the rule of law. The standards of governance threatened investors trust in public administration and starting a business. The market share in Madagascar was mostly dominated by some filial present both on the economic and political environment and used their power to exclude new challengers to the market. However, the private sector structure has changed today, and the economy is more transparent and accessible. Moreover, Madagascar made more straightforward regarding formalities by reducing the number of procedures to register a company - new companies can proceed to their registration through a provided online interface.

Concerning paying taxes, Madagascar is ranked at 134 among 190 economies with a score of 62.6 (0-100). The regional average score in Sub-Saharan Africa is 57.8. Mauritius is ranked at 5 with a score of 94. Mozambique is ranked at 127, with a score of 64 (Doing Business, 2020). Madagascar implemented an online system for value-added tax which made the procedure easier and cheaper for companies, also reduced the corporate tax rate. However, Madagascar ratio tax to GDP is one of the lowest in Sub-Saharan Africa, as it represents only 10.4 per cent of its GDP. As a comparison, the average ratio tax to GDP in the Sub Saharan Africa is 15 per cent, and for developing countries or non-resource rich low-income, the average is 15.5 per cent of the GDP (IMF, 2020).

For the protection of minority investors, Madagascar is ranked at 140 among 190 economies with a score of 36.0 (0-100), which means Madagascar is below the regional average score (38.5). To enhance the protection of minority investors, Madagascar imposed directors on the transparency among the board of directors by disclosing their nature of interest to avoid eventual conflict of interest (Doing Business, 2020). Regarding Mauritius, the country is at the 18th place with a score of 78. By exposing the systems of control and ownership, Mauritius enhanced the protection of minority investors and enhanced the accountability and transparency of companies (Doing Business, 2020). Mozambique, the country is ranked at 147th place with a score of 32. To strengthen investors protection in Mozambique, shareholders can sue directors' companies, set up extensive obligations and responsibility for directors and major shareholders, extend the range of company details available to shareholders and enables shareholders to require the appointment of an expert to investigate the company's operations (Doing Business, 2020).

Concerning the transferring property, the regional average score in the Sub-Saharan Africa region is 53.6. Madagascar is ranked at the 164th place with a score of 44.4 (0-100). Madagascar is overtaken by other countries (Mauritius and Mozambique). However, Madagascar improved the transferring property by making less costly the property transfer tax. Regarding Mauritius, the country is at the 23rd place in making easier the transferring property with a score of 82.5 (Doing Business, 2020). Mauritius made several improvements by making the registration property faster, easier and less costly. Also, improved the transparency of registration by reporting the calendar and court information on land disputes (Doing Business, 2020). Finally, for Mozambique, the country is ranked at 136th place with a score of registering 53.4. The country made the procedure easier by gathering all process at the land registry and municipality level (Doing Business, 2020).

5.2.4 Related and supporting industries

There are 145 airports and terminals in Madagascar, 126 are open to air traffic, with 56 of them open to public traffic, 45 for private use and 25 for special use. Among the 56 public domain airports or terminals, 12 are the primary airports, and 44 are secondary airports (PGE, 2019). Among the main airports are Antananarivo and Nosy Be (a major tourist attraction in the north). Due to impracticable roads and distance, one of the preferred methods of shipping goods is by air freight. However, the cost of air cargo and passenger fares are expensive, domestic air transport is connected to a few routes, and jet fuel is expensive.

Railway mode is a massified mode of transport: it is useful for transporting large flows such as liquid bulk (hydrocarbons) or solid bulk (mineral and industrial input). It may also be necessary for container transport as long as the railway operator offers a standard tender per train-block.

Rehabilitation and development projects of the railway infrastructure are underway. If these projects are successfully carried out, the railway will effectively serve the entire economy of the highland region between Toamasina (port's city), Moramanga (mineral product's place and extraction) and Lake Alaotra (place of rice production). Also, providing high cargo transportation to Moramanga or Antsirabe from Antananarivo. As well, the Southwest rail network between Fianarantsoa and Manakara could play the same role, particularly for passenger transportation and small cargo volumes. No other existing or planned projects or networks exist on the rest of the island.

The relationship of ports with their hinterland is a significant factor driving the country development and open to new opportunities. Rail and road, sea and river, compete with their respective advantages to serve the territory in connection with port infrastructure. A significant aspect is the ability of ports to cover large production and distribution centres, as well as lagging regions. Hence, the performance of the road and rail sectors (where infrastructure exists and is functional) is relevant in terms of cost and speed of delivery for the country's economy.

For transport, the topography of Madagascar is challenging. The island is primarily defined by thin coastlines divided by a sharped high plateau formed by deep gorges and cascades. This situation leads to the development of infrastructure to resolve the problem of connectivity within the regions. More broadly, restricted transport connectivity contributes to high trade logistics costs and time (Storeygard, 2016), and only more than half of the country's population is estimated to live in areas where agricultural products can be transported at reasonable transport prices. We argue that the lack of a well-integrated and functional transportation system obstructs the efficient movement of people and commodities. In this sense, it reduces domestic consumption in secondary cities, increases prices of essential products, and restricts opportunities for transportation of perishable agricultural produce and access to socio-economic opportunities.

The road infrastructure makes the distribution of goods and commodities possible in the entire country. However, the condition of the road infrastructure is generally inadequate to bad, both national, regional and local. Many regions are still poorly served under dry season conditions, and often because the secondary network is impracticable in the rainy season, different regions are totally isolated. It is also applicable to specific points of the national network. For instance, the National Road that serves the Sava from Ambilobe (regions in the North of Madagascar) has not yet been bituminous, and this economically rich and productive region has been cut off from the rest of the country frequently during the rainy season.

5.2.5 The Diamond as a system

Overall, the diamond shows the correlation between the political and socio-economic situation in Madagascar is strong. Due to the lack of transparency in administrative management, and socio-political instabilities, the private parties refrain from investing in doing business in Madagascar. In consequence, there is less labor or the quality in the market is low. Moreover, the quality of life of the population suffers. The lack of transport infrastructure shocks the exploitation of the market. This issue impacts the potential of Madagascar as the country depends on investments from different institutions. Paying taxes contributes to improving the quality of life in a country, in terms of infrastructure, medical coverage and security. However, with the low rate, the population does not benefit from these privileges.

5.3 Benchmarking

5.3.1 Port of Toamasina

According to the first Article of Decree No. 2004-702 of 14 July 2004, the status of the Toamasina port is of national interest with autonomous management. The government named the "Société du Port à Gestion Autonome de Toamasina" (SPAT) as Toamasina port authority, which is regulated by Article 8 of Law No. 2003-025 of 5 September 2003 on the statutes of ports. Figure 6 shows the port of Toamasina premises.

Figure 6: Port of Toamasina premises
Source: Regional Maritime Information Fusion Center (2017)

SPAT manages and operates the port. Its functions are defined as follows (SPAT, 2017):

- Managing activities in the port premises. For instance, caring out the management and maintenance of the port area, port infrastructure and the port real estate.
- Issuing authorizations to occupy the public port area. Including, granting authority concerning concessions and permissions.
- Monitoring the depths and carries out dredging works within the limits of the port plan.
- Taking in charge the work on extension, improvement, renewal and reconstruction of facilities located within the limits of the port area or necessary for its operation.

The bulk cargo berths are maintained by the "Société de Manutention des Marchandises Conventionnelles" (SMMC), a state-owned company. SMMC has a concession agreement with the SPAT. In this agreement, SPAT is in charge of the repair and maintenance of major structures.

In 2005, a 20-years concession under Public-Private Partnership was granted by SPAT to Madagascar International Container Terminal Services Limited (MICTSL), one International Container Terminal Services Inc. (ICTSI) branch. In this sense, MICTSL takes in charge all activities in the container terminal (operations management, finance and development of the terminal).

- *Port infrastructure*

The port of Toamasina has 3 berths, dedicated for conventional cargo, container and for hydrocarbons. In Table 6, we summarise the type of berths and their capacity in the port.

Quay	Name	Length (m)	Dredged Depth (m)	Type of Traffic Handled
Conventional Berth	Mall B	180	8,5	Imports and exports RoRo operations Imports and exports bagged Cargo
	Mall Ambatovy	200	11	
Container Berth	Mall C3	286	10,5	Import and export container cargo
Silo berth	Mall C1	217	10	For break bulk
Hydrocarbons berth	Oil terminal	60	14	Platform is 60 m and can welcome 230 m long tankers maximum
National cabotage berth	TableA	55	8,40	
	Mole A West	110	7,9	
	Mole A East	205	5,8 to 6,2	

Table 6: Type of berth and capacity in Toamasina Port
Source: Logistics Cluster (2020)

Port Handling Equipment

- Non containerised cargo

For non-containerised cargo, SMMC handles cargo with the equipment described in Table 7, in addition to 60 handling nets, 8 protection nets, 9 spreaders 20', 3 spreaders 40', and 100 pallets.

Appliance	Quantity
Cranes 37 Tons	1
Cranes 40 Tons	1
Cranes 45 Tons	1
Forklift Trucks	36
Trailers 10 Tons	21
Trailers 25 Tons	15
Trailers 40 Tons	6
Tractors	28

Table 7: Infrastructure for non-containerised cargo operations
Source: Logistics Cluster (2020)

- Containerised cargo

The terminal is equipped of Mobile Harbour Cranes, which is suitable both for general cargo, container and bulk, rubber on tires gantry cranes for stacking the containers. The equipment for handling containerised cargo is summarised in Table 8.

Container Terminal Equipment (Operational)	Quantity	Capacity
Mobile Harbour Cranes (Gottwald)	4	2x 100 MT- 2 x120 MT (twin lift) 41 MT under spreader
Rubber on Tires Gantry cranes	6	1 over 5 high
Reach stackers	6	40 MT
Empty handler	3	7 high stacking- double lift
Forklift	2	3 – 16 MT
Terminal tractors	19	190hp
Terminal Trailers	19	60 MT
Available Storage (open air)	12 ha	-

Table 8: Container terminal equipment of the port of Toamasina
Source: Logistics Cluster (2020)

5.3.2 Port of Port Louis

According to Mauritius Port Authority (MPA) (2020), the port of Port Louis is the main port of the island. MPA is the port authority, and the port is a landlord port. In this sense, MPA provides infrastructures, superstructures, facilities, marine services and aids of navigation to the users. The port handles 99% of the cargo throughput and is the main gateway of Mauritius. Port of Port Louis is the transhipment hub serving the east of Africa. Besides, Mauritius imports mainly food, raw materials for textile, and the majority of the island exportation is sugar and textiles.

The port has three terminals, one cruise terminal and one oil terminal. Cargo Handling Corporation Limited (CHCL), a publicly owned company handle both the container terminal and the multipurpose terminal. MPA and CHCL agreed for a concession contract of 30 years for these operations.

Figure 7: Container terminal of Port Louis's Port
Source: Mauritius Port Authority (2015)

The port of Port Louis is competitive in terms of infrastructure. The port can receive up to 13,000 TEU vessel, which means, the lengths are long and drafts are deeper.

TERMINAL I comprise the Old Port in the Peninsula Area and the Fishing Port at Trou Fanfaron

Quay	Length (m)	Dredged Depth (m)	Type of Traffic Handled
A	210	12.2	Fuel oil, Edible oil, General cargo, Maize, Molasses, Soya-bean meal, Wheat, Passengers and Inter-island trade
D	170	12.2	Fuel oil, Edible oil, General cargo, Maize, Molasses, Soya-bean meal, Wheat, Passengers and Inter-island trade
E	135	9	General cargo, Passengers and Inter-island trade
Trou Fanfaron I	160	5.5	Fish
Trou Fanfaron II	185	6	Fish
Froid de Mascareignes	310	4.6 - 8.0	Fish

Table 9: Terminal I, port of Port Louis
Source: Mauritius port Authority (2020)

TERMINAL II The Multi-Purpose Terminal consisting of Quays 1, 2, 3 and 4

Quay	Length (m)	Dredged Depth (m)	Type of Traffic Handled
No.1	123	13.5	Fuel Oil, Coal, Fertilizers, White oil
No.2	180	12.5	Cement, Coal, Containers, General Cargo
No.3	185	12.5	Cement, General Cargo & Containers
No.4	185	12.2	General Cargo, Containers, LPG & Bitumen
Bulk Sugar Terminal	210	12.5	Bulk sugar, Fuel Oil
Cruise Jetty	124	12.5	Cruise & Non-commercial vessels
Mauritius Freeport Development	118	7	Fish

Table 10: Terminal II, port of Port Louis
Source: Mauritius port Authority (2020)

Terminal III comprises the Mauritius Container Terminal (MCT) at Mer Rouge.

Quay	Length (m)	Dredged Depth (m)	Type of Traffic Handled
MCT1	400	16.5	Containers
MCT2	400	16.5	Containers

Table 11: Terminal III, port of Port Louis
Source: Mauritius port Authority (2020)

The MCT is equipped with:

- 2 Super Post Panamax and 5 Post-Panamax Rail Mounted Gantry cranes
- 14 Rubber Tyred Gantries
- Turning circle of 450m diameter
- Storage area of 21 hectares
- 576 reefer points
- Container Scanning Facility

5.3.3 Port of Beira

The port of Bera is managed by Portos e Caminhos de Ferro de Moçambique (CFM). A joint venture between CFM and Cornelder Group, Cornelder de Moçambique (CdM) operates the container and General Cargo Terminals in the port of Beira. This agreement leads CdM to operate for 25 years (starting in 1998). The port of Beira is a regional port and has the advantage to have a large hinterland. The port is connected via road or railways transportation to Zimbabwe, Botswana, Malawi, Zambia and Democratic Republic of Congo (CdM, 2020).

One differentiation factor for the port of Beira is its association to Beira Agricultural Growth Corridor (BAGC). BAGC is a Public-Private Partnership (PPP) between the Government of Mozambique, private investors, international agencies and farmer organisations. The objective of this PPP is to promote investments in commercial agriculture and agribusiness in Mozambique regions.

Figure 8: Multi-purpose container terminal of the port of Beira.
Source: Cornelder de Moçambique (2019)

The port of Beira has three terminals (one multi-purpose container terminal, one multi-purpose general cargo terminal, one bulk solids terminal). Table 12 summarised the details for each of them. The berths of the port are shallow.

Berth	Length (m)	Depth (m)	Type of Traffic handled
1	176.77	-	Fishing Harbour
2-4	484	12	Container terminal/Ro-Ro
5	165.53	12	Container terminal/Ro-Ro
6	170	10	Refrigerated Cargo/Fresh Produce/Pax
7	165.5	10	General Cargo terminal
8	187.9	10	Coal terminal
9	167.3	10	General Cargo terminal/ Ro-Ro
10	167.3	10	General Cargo Terminal/ Ro-Ro/ Pax
11	128.55	10	Oil terminal
12	264	13.5	Oil terminal

Table 12: Terminals of port of Beira
Source: Cornelder de Moçambique (2020)

From these presentations, we notice the port of Port Louis has the largest draft than the port of Toamasina and port of Beira. In this sense, Mauritius can accommodate bigger vessels than the two other ports. However, Toamasina has the project to deepen the container berth up to 16 metres.

5.3.4 Port throughput comparison

To evaluate the competitive position of the various ports, an analysis of the cargo throughput is undertaken. All data was collected from the respective ports authorities and port operators, however, for the port of Beira statistics from 2017 to 2019 are not available.

The cargo throughput for the three countries is shown in Figure 9. From this figure, the cargo throughputs of Mauritius and Mozambique compared to Madagascar are largely higher. It should be noted, considering for Madagascar and Mauritius, respectively the port of Toamasina and the port of Port Louis are main gateways for each country (more than 90% for Toamasina and 99% for Port Louis). However, Mozambique has three ports which are the port of Maputo, Beira and Nacala. Compared to other countries, Mauritius as a transhipment hub for the East African region has a high cargo throughput.

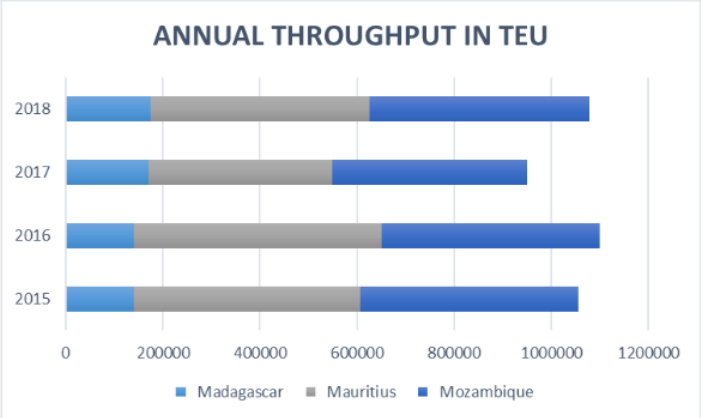

Figure 9: Annual throughput in TEU Madagascar-Mauritius- Mozambique
Source: UNCTAD (2020)

The Figure 10, presents the evolution of both port of Toamasina and port of Port Louis, measured in TEU. From this figure, the port of Port Louis handles more containers cargoes than the port of Toamasina. From this figure, in 2019 the cargo throughput of the port of Toamasina decreased, beside the port of Port Louis increased.

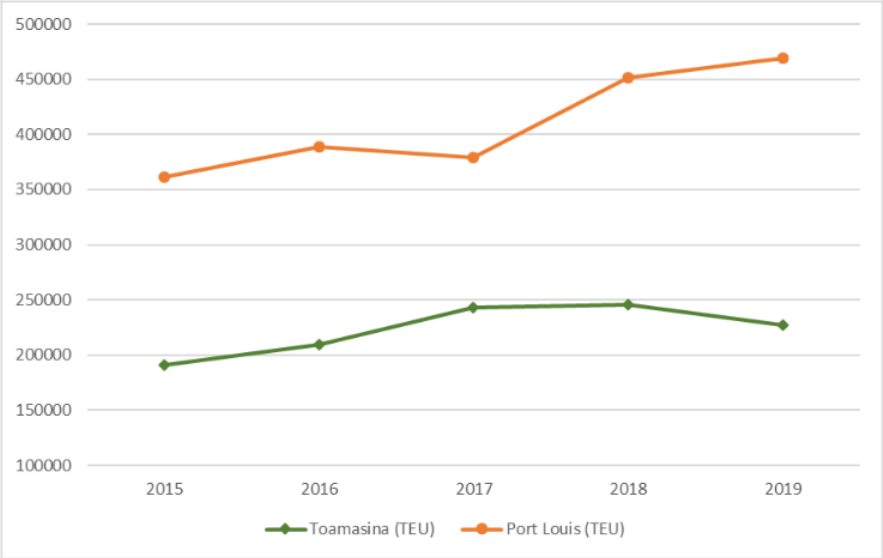

Figure 10: Container throughput evolution port of Toamasina and port of Port Louis
Source: SPAT (2020), MPA (2020)

Looking at the cargo volume of Toamasina, the majority is composed of container cargo and bulk cargo, respectively 2,448,382 tons and 2 498,985.817 tons in 2019 (see Figure 10). The bulk cargo is principally the exportation of Nickel and Cobalt. These last come from the mines in Moramanga (80 kilometres from the capital city). Port Toamasina experienced an increase in container cargo between 2015 and 2018 and dropped in 2019.

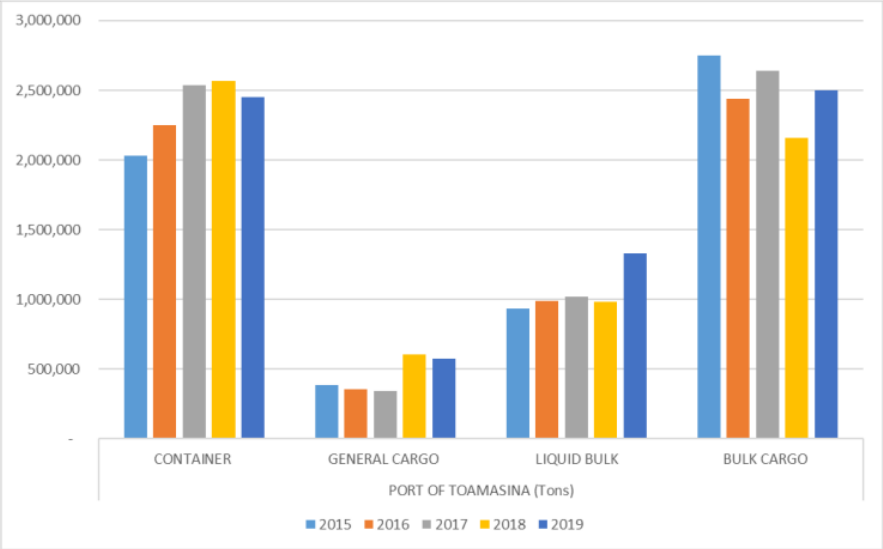

Figure 11: Cargo throughput Toamasina in tons
Source: SPAT 2020

The port of Port Louis cargo throughput is mainly container cargo and liquid bulk cargo (see Figure 12). The container cargo is composed by transhipment and export-import cargoes. In 2019, the container cargo for Port Louis was aggregated as follow: transhipment 192,864 TEUs, importation and exportation 276,147 TEUs (MPA, 2020). General cargo for the port is steady, however, at a low volume (51,817tons in 2016 and 53,363tons in 2019). The general cargo is composed by bagged cargo, unitised breakbulk and cargo to the Rodrigues. The bulk cargo in 2019 was 1.9 million tons, 12.7% increase in volume. Mauritius bulk cargo is composed mainly of sugar, cement, soya bean meal (MPA, 2020).

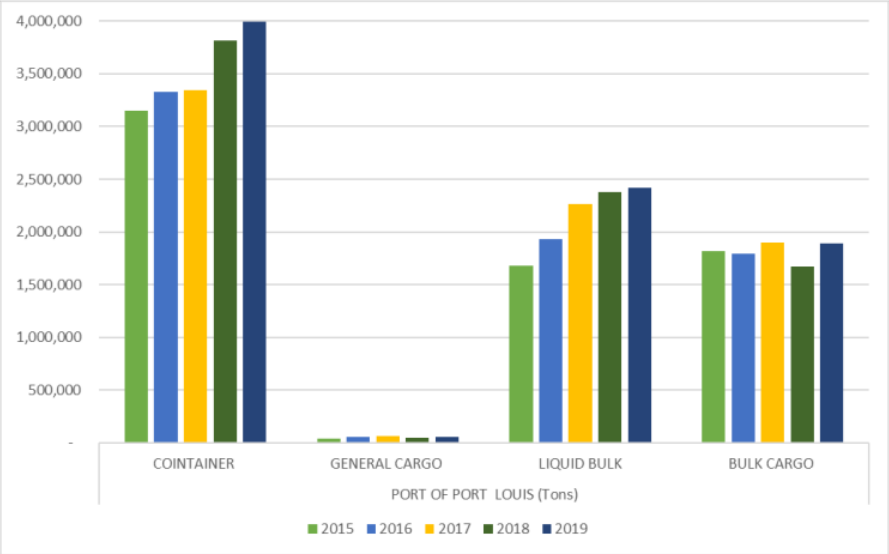

Figure 12: Cargo throughput port of Port Louis in tons
Source: MPA (2020)

Concerning the port of Beira, its throughput experienced a sharp drop in bulk cargo in 2015 (Figure 13). The most likely reason, we argue, is due to the dry bulk being a volatile market. Moreover, according to Ma (2020), bulk cargo belongs usually to one company, but localised in different countries. Furthermore, as the cargo is at a large volume, it might require to the company to ship in more than one voyage. In this sense, the shipper is free to schedule the time, transport and frequency of delivery. Besides, as the port of Beira covers a large hinterland, which indicates that the volume for each type of cargo might not be not only from a single region but also for other countries in the hinterland.

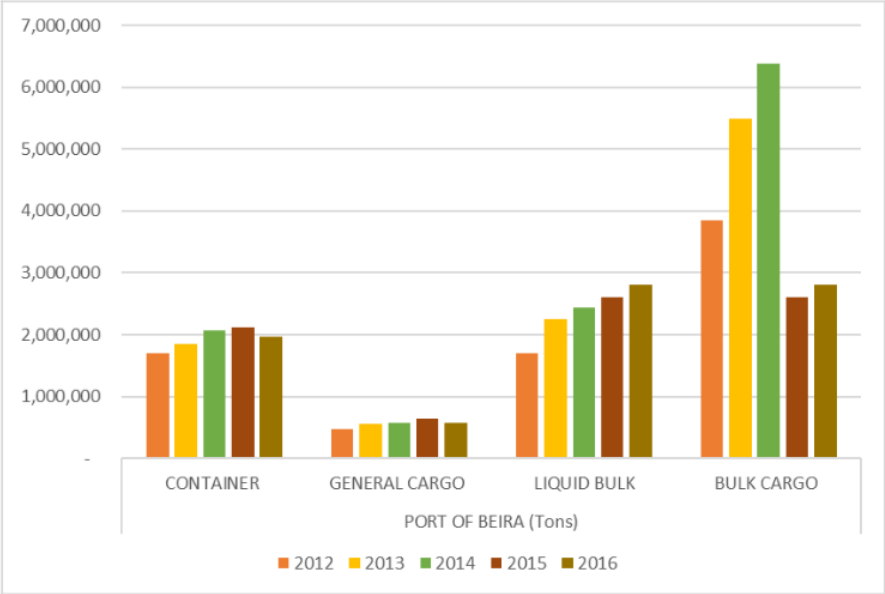

Figure 13: Cargo throughput port of Beira in tons
Source: Cornelder de Moçambique (2017)

The analysis also shows that, when compared with its neighbouring countries, Madagascar has a smaller capability to integrate the existing maritime networks compared to other countries (see Figure14). Since 2014, Madagascar's LSCI has been declining thus not showing any signs of convergence with its neighbours. As regards bilateral connectivity, UNCTAD (2019) has assessed that Madagascar is primarily linked to Singapore, Oman, Reunion and Mauritius. These lasts are the principals' hubs from which maritime flows leave or arrive through Cap of Good Hope.

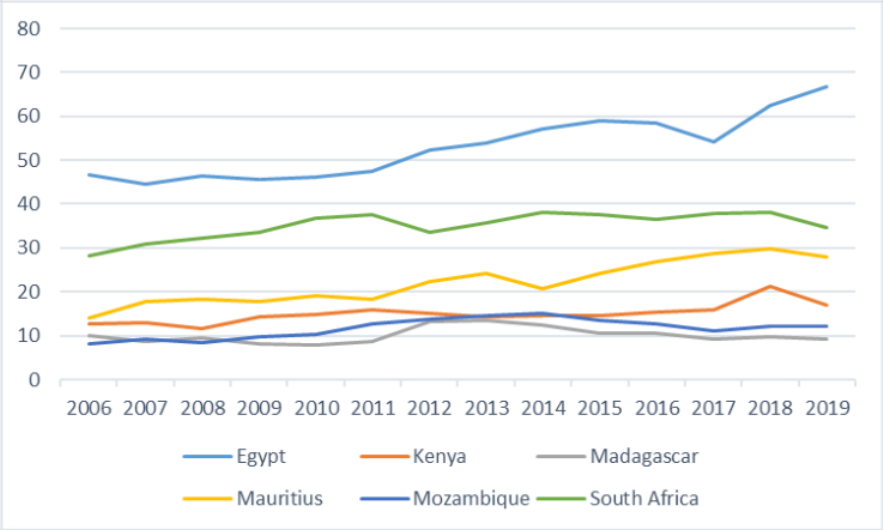

Figure 14: Liner Shipping Connectivity Index of Madagascar and other countries
Source: UNCTAD (2020)

Madagascar belongs to the South-East African region, which is far from strategic passageways (Strait of Gibraltar and the Suez Canal). Compared to these passageways, the route via Cape of Good Hope is not significant in terms of cargo volume (Notteboom and Fraser, 2020).

Using the liner shipping transportation is complex. The transportation is carried by one vessel, but the cargo to deliver belongs to different customers in different countries or ports. Aside from the fact that Madagascar is far from the passageways mentioned above, we argue that shipping companies choose wisely on which country (port) to call. As liner shipping schedules are tight (several ports to call for the same route) and the cargo transported are time-sensitive (the value of the cargo transported might change following the current market), shipping companies target mostly ports able to provide a high volume of cargo in less time. From the above, to be competitive and attract shipping lines, the port should be first able to receive large vessels to gain in term of economies of scale, and second should be performant on operation at the shore.

Referring to Figures 11 and 12, specifically on the volume of container cargo Toamasina and Port Louis provide, Toamasina has less cargo than Port Louis. However, the volume of empty container in Port Louis is higher than Toamasina (see Figure 15). In this sense, we argue that the container traffic trade imbalance is more important in Port Louis than Toamasina. Noting, trade imbalance is also costly for the shipping company as regarding the cost empty container

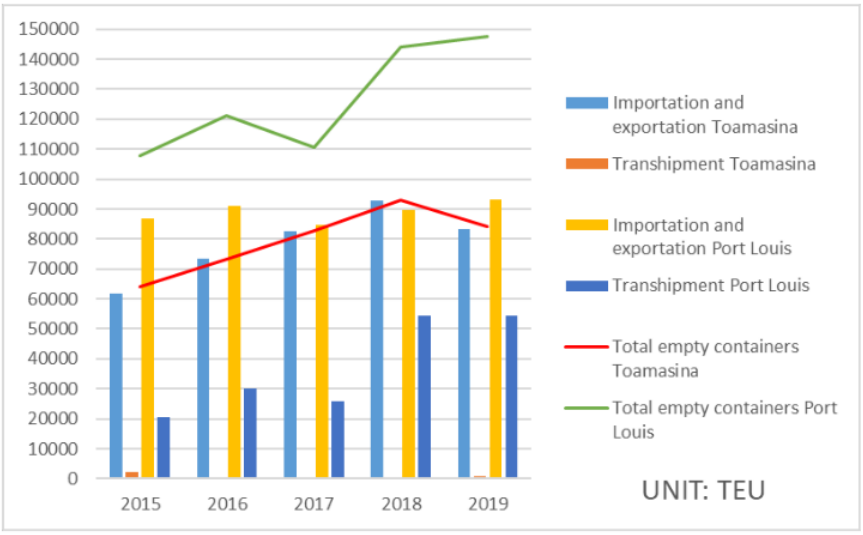

Figure 15: Number of empty containers for port of Toamasina and Port of Port Louis
Source: SPAT (2020), MPA (2020)

Figure 16 shows the Port Liner Shipping Connectivity Index (PLSC) for the three ports. The port of Port Louis is the most attractive for shipping companies compared to the port of Toamasina and Beira. This means Port Louis can receive vessels frequently (every six days), able to trade a large volume of import and export, has a high number of regular services, has a high number of shipping companies competing for each other to call for the port, able to receive large vessels, a high number of countries is directly linked to the port (UNCTAD, 2019).

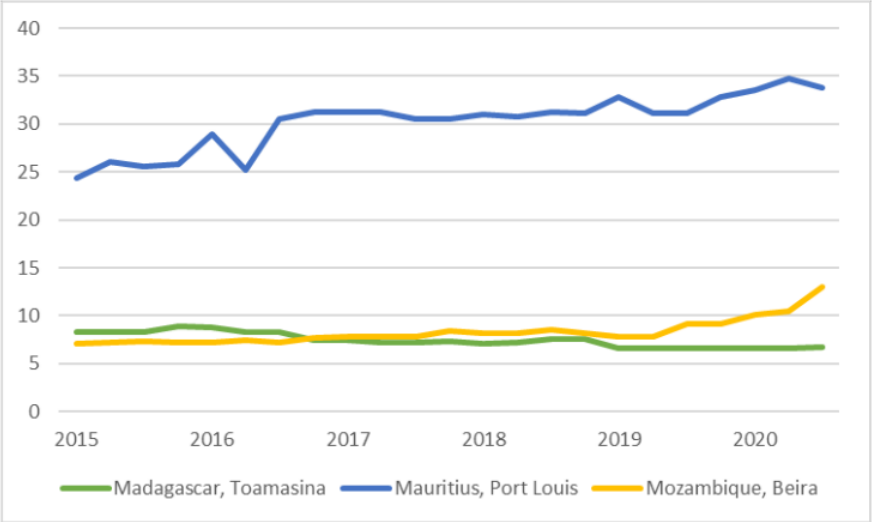

Figure 16: Port Liner Shipping Connectivity Index for the three ports
Source: UNCTAD (2020)

5.3.5 Logistics Performance Index

As mentioned, traders (experts in private parties) assess the country's logistics "friendliness" in the objective to evaluate if the trade facilitation of a country satisfy the needs. In response to this evaluation, policymakers (public parties) can improve the quality of the logistics by proposing different solutions. These solutions might vary depending on the need. For example, building or repairing infrastructures, implementing different measures.

According to World Bank (2018), Madagascar's rank at the 137 position among the 167 countries. The LPI mean score from 2012 to 2018 is 2.35, which represent 56% comparing to the highest performer (Germany is the top performer at score 4.19). The six components scores representing the measurement of the LPI of Madagascar are summarised in Table 13 (2012-2018 average). From this table, the quality of trade and transport infrastructure is the least satisfying from the users' experience. However, the indicator of the frequency with which shipments reach consignees within scheduled or expected delivery times is the most satisfying.

Number	Indicators	Score
1	Efficiency of customs and border management clearance	2.32
2	Quality of trade and transport infrastructure	2.16
3	Ease of arranging competitively priced shipments	2.22
4	Competence and quality of logistics services – trucking, forwarding, and customs brokerage	2.25
5	Ability to track and trace consignments	2.42
6	The frequency with which shipments reach consignees within scheduled or expected delivery times	2.7

Table 13: LPI mean score of Madagascar from 2012 to 2018
Source: World Bank (2018)

The evolution of Madagascar's LPI from 2012 to 2018 is plotted in Figure 17, where we see the level of users dissatisfaction in 2016 compared to 2014 about the timeliness. Such indicators are important for tools for policymakers to develop plans and strategies that improve Madagascar logistics performance. We argue that doing this evaluation is a starting point to enhance the competitiveness of the country in terms of logistics.

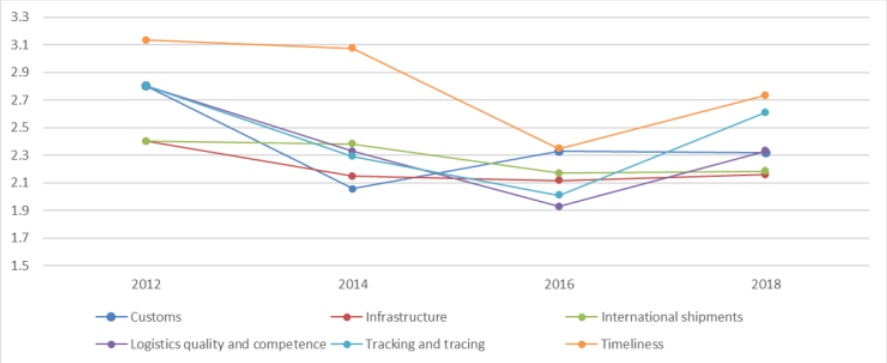

Figure 17: LPI's Madagascar evolution from 2012 to 2018
Source: World Bank (2018)

Figure 18 shows the comparison between Madagascar and Mauritius' LPI in 2018. Overall, Mauritius LPI is higher than Madagascar, except for the international shipments indicator, which is slightly higher (2.12 for Mauritius and 2.19 for Madagascar). Madagascar is advanced by Mauritius, especially in terms of infrastructure and logistics competence.

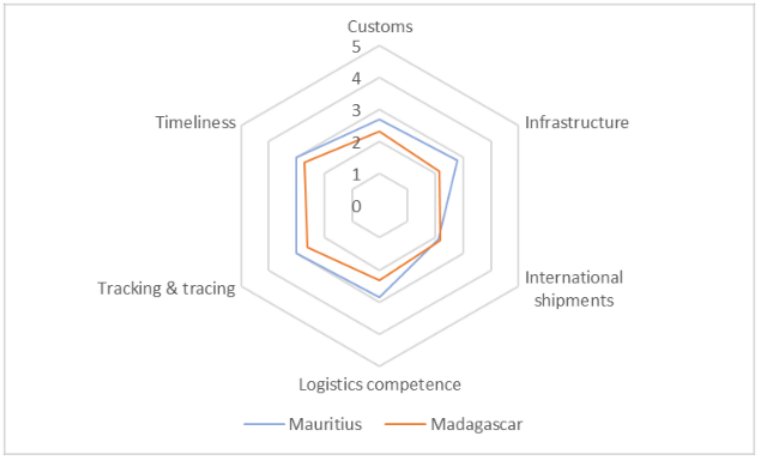

Figure 18: LPI Madagascar compared to Mauritius in 2018
Source: World Bank (2020)

In Figure 19 Madagascar's LPI is compared to Mozambique following the data in 2016 (Mozambique is not present in the LPI scorecard for 2018). Mozambique performs better than Madagascar in terms of international shipments (2.19 for Madagascar and 3.06 for Mozambique). Mozambique likely prioritises this dimension as the country serves as a gateway for different countries in the hinterland. However, for the five remaining indicators, Mozambique and Madagascar are almost on the same level.

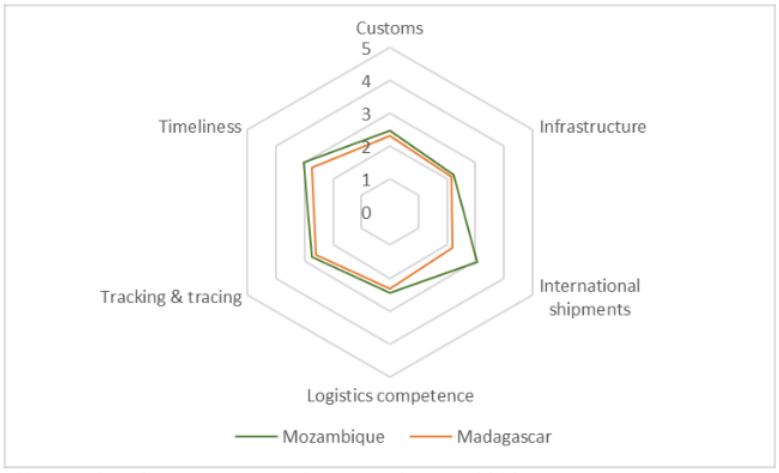

Figure 19: LPI of Madagascar compared to Mozambique in 2016
Source: World Bank (2020)

In Figure 20, Madagascar's LPI in 2018 is compared to the Sub Saharan Africa region. Overall, Madagascar LPI is at the same level as other countries. Only the international shipment for the Sub Saharan Africa is higher than for Madagascar (2.52 for the region and 2.19 for Madagascar).

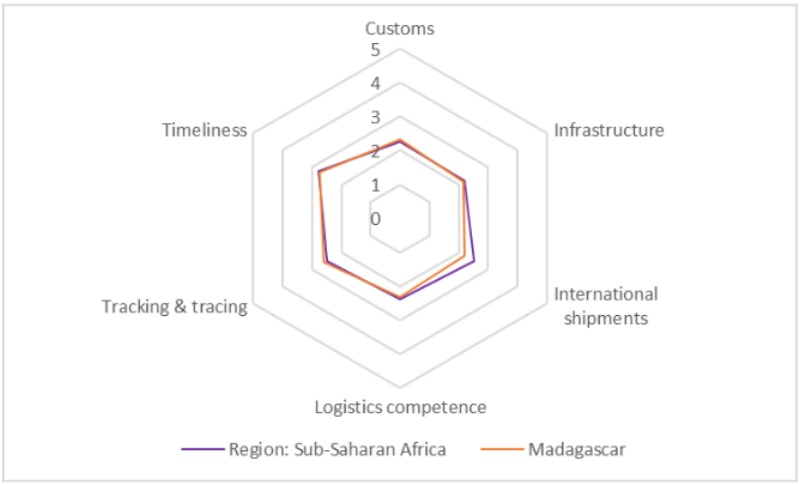

Figure 20: Madagascar LPI 2018 compared to the Sub-Saharan Region
Source: World bank 2018

When it comes to the selection of ports, shipping companies are meticulous on assessing indicators such as these. Prior to ensure a high volume of cargo, shipping companies extend their activities on the inland side and perform on broader services. In this sense, vertical integration is a way to insure the cargo volume. Controlling the cargo flow from and to the inland has become a priority, such as the development of warehousing, distributions activities to insure the timeliness of the distribution.

As shown, Madagascar LPI is low compared to other countries, thus a risk from the investors' point of view. Investors put trust in the reliability of country competence and infrastructures. The lack of infrastructure leads investors to invest in other aspects that are far from the core of the business, thus adding weight to the decision to invest. By turn, the lack of investment intertwined with deficit infrastructure also have an impact on the overall business country of the country, and by consequence, the overall economic development of the country.

5.3.6 Maritime access

Regarding the maritime access, according to World Bank (2017), the port of Toamasina and Port Louis have an average waiting time about 10 hours, whereas the port of Beira does not have a waiting time. Also, the use of the port capacity ratio is higher for both port of Toamasina and Beira when compared with the port of Port Louis. Similarly, the ratio of depth usage is overused for Toamasina and the Beira. Moreover, the technical efficiency on the container terminal operations, Toamasina and especially Beira are not efficient. From the above, we argue that concerning the average time, congestion is higher among the ports of Toamasina and Port Louis than the port of Beira. Relating to the depth of the port both the port of Toamasina and Beira are inefficient. Same for the inefficiency of the container terminal, leading shipping lines to reduce the number of call for these ports.

5.4 SWOT analysis – port of Toamasina

5.4.1 Strengths

A significant strength of the port of Toamasina is its port operation, MICTSL. As a private company and specialised in port operations, the company have a substantial amount of expertise. Also, as a private company, MICTSL seeks to increase the profitability of the terminal. The relationship between the two main operators, MICTSL and SMMC, with the port authority (SPAT) is evaluated as being good. For example, MICTSL proposed to extend the port facilities (i.e. the construction of the container Berth) to SPAT, subsequently SPAT presented to the MTTW which gave the authorisation.

Furthermore, the actual port expansion is expected to improve the road traffic to the port. Besides, the new draft (deep than the current), the port can receive larger vessels than today. This can even be an opportunity for Toamasina to become a transhipment hub in the region. Moreover, with the construction of the new berth, the port can propose a dedicate berth to attract shipping companies.

5.4.2 Weaknesses

A significant weakness of the port of Toamasina is its draft not being deep enough to accommodate large vessels, and consequently not being able to receive vessels able to carry more than 3,200 TEU. Thus, the country uses feeder vessels to connect to neighbouring countries. This operation increases the cost of the cargo as the economies of scale at sea are very limited. Besides, the container terminal does not possess multimodal facilities. The only transportation mode available is road (trucks). Thus, at its high peak, a high level of congestion at the port gates exist, which have repercussion on the traffic flow for the city. In addition to that, the port is surrounded by the city, which makes an eventual future expansion to be most likely by reclaiming land from the sea.

The port is located in a region with high competition from other ports, more specifically, from Mauritius and South Africa. Both of these countries are on the main routes and are considered transhipment ports.

5.4.3 Opportunities

The population growth rate is still high in Madagascar (2.65 per cent in 2019), thus it is expected that the demand for goods and commodities to be increasing accordingly. Because Madagascar is an export of agricultural goods, fostering this industry will most likely lead to an increase in the cargo throughput of the port.

The country is also part of several trade agreements and arrangements, which are an opportunity to attract new investors, develop industries sectors, thus increasing exportation.

5.4.4 Threats

Even though the population is growing, the economy is still fragile. This is seen in its weak local currency which affects the prices of imports and exports. The local labour is unskilled due to low quality of education, resulting in a poor quality of work (World Bank, 2020).

Investment from the government in terms of infrastructure is lacking. In consequence, the main issue for the development plan of the port concerns the growth of hinterland connectivity. The port of Toamasina is the first international trade gateway of Madagascar, and the port handles the majority of the country's cargo (80 per cent of all cargo). However, serving a country of more than 580,000 km^2, the current poor infrastructure conditions (transport mode, roads, ports) threatens Madagascar logistics performance and consequently its economy. For example, a journey from Toamasina to Antananarivo (360 km) by truck requires 48 hours. Also, the port of Toamasina deviates slightly to the main shipping route compared to the ports of Port Louis and port of Durban.

The port of Toamasina is an autonomous port under SPAT authority, and SPAT fulfils the management of the port. However, APMF's role to the port can create governance conflicts as the role of each institution and in the management of the port. Also, there is a strong vertical integration from the public administration in the transport industry.

5.5 Strategic outlook for the port of Toamasina

The port of Toamasina handles about 90 per cent of container cargo and is the largest port in the country able to receive huge volumes of cargo. Moreover, compared to other ports in Madagascar, Toamasina is the only port with enough infrastructure and the maritime access able to accommodate mid-sized vessels (up to 3,200 TEU). Its geographical location makes it to be the closest port to both the capital city, Antananarivo, and the mine Ambatovy. Both highly important to the economy of the country:

- Antananarivo represents 28 per cent of Madagascar population and is the largest market for the port. The growing population is expected to lead to increased levels of international trade.
- The mine Ambatovy provides the majority of bulk cargo. The existing mineral resources constitute a significant source of exports.

The port of Toamasina is the most competitive. However, when looking at the regional scale, the port of Toamasina is less competitive in terms of logistics performance than its neighbouring ports, namely the port of Port Louis and Beira. Improving the logistic performance of the port on all levels is a top priority. Resources should be spent on making sure the logistic performance follows a positive trend, in contrast of what has been registered in the past.

Despite the investment to expand the port, which is targeted to the foreland, hinterland connectivity remains an obstacle for the better logistic performance of the port. Encouraging the port operator to cooperate with the government to increase the quality of the transport infrastructure is vital for making sure the port is effective and efficient. A possible solution pass by implementing a modal shift in the port, which would reduce the congestion levels registered from and to the port's gate.

The port as a node in a supply chain depends on the flow from the place of production to the port. Even though the quality of the port infrastructure is good, the private party seeks to insure their investment. Hence, the logistics infrastructures should be of high quality, provided by competent people.

CHAPTER 6 SUMMARY AND CONCLUSION

6.1 Conclusion

The study analysis on how port competitiveness can be increasing by enhancing the logistics performance, with a focus on the port of Toamasina, Madagascar. The analysis looked at the external and internal environment of the port. The external analysis was done using the PESTL analysis and Porter's Diamond model, whilst the internal environment employed a benchmarking approach complement with a SWOT analysis.

The PESTL analysis showed that the political and economic environment has a significant impact on the performance of the port. The diamond model has shown that FDI is high and has a vast potential to grow significantly for the mining and agricultural industries; however, investors seek for more transparency from the administration. The strength of the port of Toamasina is seen in the good relationship between the port operators and the port authority. Some of the weaknesses of the port are inadequate infrastructure facilities and intermodal connectivity. However, a lot of opportunities and potential were identified. These include the large population in size, development of the agriculture industry and integrations to regional agreements. The competitors from more advanced economies and the instability of the economy, impact the port. Additionally, the LCSI and LPI of Madagascar are low from the benchmark analysis with Mozambique and Mauritius.

Generally, from both analyses, the port of Toamasina is highly disadvantaged to its competitors as the weaknesses and threats outweigh the strengths and opportunities. From the analysis, the quality of the port infrastructure is not enough to increase the port competitiveness, but equally important is the support from the government in implementing reforms that render the port more competitive. The port is a part of a supply chain, and every part should also be improved to raise its competitiveness.

6.2 Recommendations

The government should improve the implementation of policies on transport as the port depends on the accessibility to both the maritime and land sides. One way of realising this is by ensuring that the appropriate ministries are involved in the port sector, policymaking and implementation.

The government should improve transport facilities from the port of Toamasina to Antananarivo, the railway quality in the country is poor, however, prevent from congestion.

Policies aimed at attracting private participation should be encouraged. This can be done through the use of PPP in a win-win situation for all parties.

The government and port authority should improve the transport capacity through training and capacity building.

6.3 Limitations and future researches

The research undertaken was challenging as information scares and scattered. The analyses could have benefited from interviewing relevant stakeholders to understand their roles and the perception of the market dynamism in the country. This research would have required additional time to understand and put on the context of the country and the port. For future research, it would be important to establish concrete strategies on how to realise the recommendations mentioned above.

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